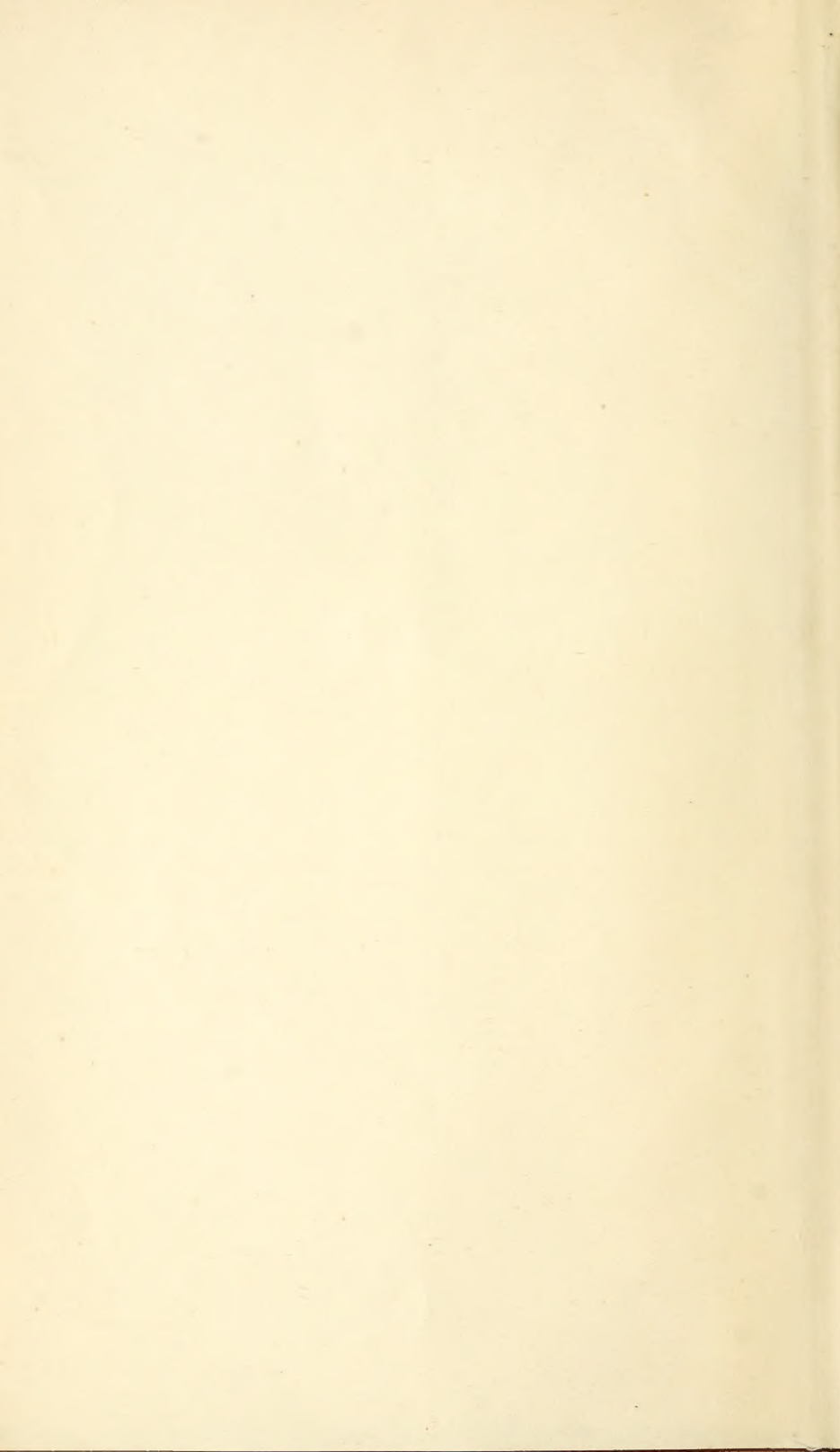


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THE NAUTILUS

A MONTHLY JOURNAL
DEVOTED TO THE INTERESTS OF
CONCHOLOGISTS.

VOL. III.

MAY 1889 to APRIL 1890.

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NOTE.

The predecessor of the Nautilus was "The Conchologists Exchange," established in 1886, by Mr. W. D. Averell. Two volumes were published varying in size from a postal card to the form of a small 12mo.



THE NAUTILUS.

VOL. III.

MAY, 1889.

No. 1.

INTRODUCTION.

THE publishers of THE NAUTILUS feel that no explanation of their object in offering this journal to the scientific public is necessary. The need of an American publication devoted especially to the interests of Conchologists is felt throughout the country. One of the greatest difficulties which the student of science has to overcome is found in the scattered and fragmentary character of scientific literature. The "Proceedings" or "Transactions" of a hundred societies, and the pages of innumerable journals must be searched through before one can be certain that a given fact or observation has or has not been recorded.

The simplest way to better this condition of things will be to limit by some means the number of publications in which a certain subject is likely to be treated upon; and this is most easily done by establishing journals devoted to special branches of science. It is the aim of THE NAUTILUS to afford such a medium for all who are interested in studying the Mollusca; and to this end the co-operation of all friends of science is solicited.

All subscribers to the *Conchologists' Exchange* (of which this paper is the successor) will be credited on the books of THE NAUTILUS with the amounts due them upon the suspension of that journal. All subscribers will be allowed one insertion of twenty-five words in the Exchange Column, free of charge.

NOTES ON THE SOFT PARTS OF *TROCHUS INFUNDIBULUM* WATSON

With an account of a remarkable Sexual Modification of the

Epipodium, hitherto undescribed in Mollusca.

BY WM. H. DALL, CURATOR DEPT. OF MOLLUSKS, U. S. NAT. MUSEUM.

The presence of a verge, or intromittent male organ, has hitherto, among the Rhiphidoglossate Mollusks, been recorded only in *Neritina* (Claparède) and certain Limpets. The organ as it exists in *Neritina* and *Nerita*, is so short and obscure that its function and even its existence has been called in question. When I showed its existence in the rather anomalous *Addisonia paradoxa* and *Cocculina spinigera*, curious deep-sea limpets, it was questioned whether they were not peculiarly modified *Tænioglossa*.

Since then, in several deep-sea Mollusks, such as *Rimula*, *Margarita* and others indisputably belonging to the *Rhiphidoglossa*, I have found a well-developed verge; and there is little doubt that the ancestors of this group, as well as of the *Tænioglossa*, were so provided, and that some of these deep-sea forms have retained the organ now generally obsolete in their shallow water congeners. In combination with this survival, one of the species, *Trochus infundibulum* Watson, offers a singular and very interesting special modification of the anterior portion of the epipodium on the right side, which appears worthy of particular attention.

The soft parts of this species afford several notes of interest. The external parts, except the eyes, are white. The foot is wide, straight and double-edged in front, and, as far as one can judge from specimens contracted in alcohol, must have been somewhat pointed or produced at its anterior corners in life. The sides of the foot are nearly smooth, below the epipodial line.

The muzzle is small and slender at its proximal end, enlarged and transversely semi-lunar at its distal extremity. The oral surface of the muzzle is smooth, the mouth very small; the oral disk is flat and produced on each side into a thin linguiform lappet, with simple and entire edge. These lappets are remarkably long, their ends reaching as far as the ends of the true tentacles, and serve as tactile organs, like the oral tentacles of the *Lepetidae*, or the much smaller lappets of *Aemæa*. When not feeding, or seeking food, these lappets would seem to be applied to the sides of the foot below the epipodium.

The oral disk is entire, but is slightly indented in the median line below a furrow running up toward the mouth.

The cephalic tentacles are very stout and large, very elongate-conical, with moderately pointed tips. They are situated above, and not, as in most *Trochidae*, on each side of the muzzle. Their inner bases are connate, and there is no intertentacular "veil," or any tubercular traces thereof.

The eyes are large, strongly pigmented, ovoid, and sessile on the outer bases of the tentacles, or perhaps I should say, just by the outer bases. They are not pedunculate or elevated on pedicels in any of the specimens examined, and I am quite confident that this is not caused by the contraction due to alcohol, but is normal to the species.

The epipodial apparatus is complicated, and exhibits a certain amount of variation between different individuals in the situation and number of its processes. In the males, it is subjected to a remarkable modification for sexual purposes. The epipodium begins immediately behind the eye and a trifle below it. In the females it is produced into a large broadly linguiform process, half as long as the cephalic tentacles and fringed with close-set uniform small pointed papillæ or filaments. This process exists in the male on the left side. The posterior margin then curves in toward the side of the foot; it becomes quite narrow and shows two lateral tentacles of moderate size; then a vacant space; then at the front edge of the operculum two or three filaments, small, but larger than any in the vacant space; then another, but larger one; and finally another, which is behind the middle of the operculum, and is the last on that side. The epipodial line is continued to the end of the foot, the dorsal surface above it, being transversely rugose and with a linear median furrow. On the other (right) side we find a small, a large, two subequal small, another large filament, followed by a slight gap and then by a still larger tentacular process. The flap which corresponds to the fringed process on the left side, is remarkably modified in the male.

Behind, and close to the right eye, is a small tubular, longitudinally striate, cylindrical verge, not exceeding (in alcohol) two millimetres in length. Below it the epipodial flap is enormously produced, and its front edge is rolled backward upon itself, forming a tube into the proximal opening of which the end of the verge may project. The flap is rolled so that it makes nearly two layers, and thus a very capable cylinder, which, when unrolled and released,

will immediately coil itself up again. This cylinder is of subequal diameter throughout, and is as long as, and somewhat stouter than, the cephalic tentacles. Externally, near its base, it is nearly smooth; further out, it is spirally striate; near its extremity, it becomes thicker and rather deeply externally grooved longitudinally, with short, even, close-set, slightly spiral, grooves. The opening at the distal end is fringed with short, equal papillæ, each one corresponding to the thickened interspace between two of the grooves. These raised folds, or interspaces, are also finely transversely striate. At the base of the cylinder, the epipodium extends backward to the first lateral filament; and the margin of this part is perfectly entire and simple, showing neither fringe nor granulation. The object of this apparatus is self-evident. The cylinder serves as *a conduit for the seminal fluid ejected from the verge*. Whether it may be employed in an actual copulation is doubtful; it may merely serve to spread the seminal matter over the eggs as they are deposited by the female. I am not aware that anything of this sort has been observed in any other gastropod, up to the present time.

The edge of the mantle is smooth, entire, and slightly thickened. Within the nuchal chamber the anus is visible on the right side. The end of the intestine, for a considerable distance, is free from the mantle and projects like a tentacle. The termination is slightly constricted, then enlarged into a cup, or trumpet-shaped ending, which nearly reaches the mantle-edge.

The intestine itself, after leaving the stomach, is much convoluted, but in the main, rises and is brought forward nearly to the mantle-edge above the stomach: then turns back and is carried far into the visceral coil before it is again brought forward and terminated as above described. The food consists of Foraminifera.

The gill is free, except at its base, and consists of very elongate-triangular foundation, from which depend triangular lamellæ, without a raphe and wide at their bases. These grow larger proximally.

The operculum is thin, polished, amber-colored, centrally depressed, having a central projection, or nipple, on its under-side, and consists of about four whorls.

The specimen affording the above notes has been identified with Mr. Watson's type specimen, and is now deposited with it in the British Museum. It was dredged by the U. S. Fish Commission east of Chesapeake Bay, in 1685 fathoms.

CAST UP BY THE SEA.

BY E. W. ROPER, REVERE, MASS.

While cleaning up the trophies of a recent successful trip to the beach, I wondered if my fellow shell collectors, who live near the seashore, appreciate the need of closely following up the storms. It is not enough to go occasionally. The beach ought to be searched every time a strong on-shore wind brings in a heavy surf. And the visit ought to be made at the first low tide. Another flood tide with change of wind may bury the most precious treasures under the sand. I may go nineteen times to the three-mile beach near my home, and get nothing new, although I should never come home empty handed; but on the twentieth visit a shell is found of a species I have not before collected. Once it was a little red *Margarita undulata*; and again a *Bela harpularia*. Only the enthusiastic collector knows the peculiar pleasure of such discoveries, and only the collector experiences a pang at the sight of some rare shell hopelessly broken, as I have many times seen the fragile *Thracia conradi*. The latter and other bivalves live beyond low-water mark, very likely so deep in the sand that a dredge would pass over them. But in a heavy easterly gale the great breakers, pounding on the outer bar at low tide, plow up their home, and rolling over and over, the helpless shells are brought to shore by the incoming tide. It is noticeable that seldom do two storms bring in a similar class of shells.

I remember one gale which literally strewed the beach with tens of thousands of the "little amethystine gems" which Totten called *Venus gemma*. Another time the razor shells and the pretty *Machæra costata* will suffer, and again the prevailing species will be *Lunatia*, *Buccinum* and *Fusus*. Eight times, in as many years, I have found the large *Solemya borealis*, twice alive. The little *S. velum* is more common. Once I captured a living *Pecten tenuicostatus* of large size. How violently he opened and shut his shell when placed in a shallow pan of fresh water! But in spite of assiduous collecting I can note less than seventy marine shells found in Revere. Doubtless collectors on more southern shores can find a greater variety.

GENUS MAKING.

BY CHAS. T. SIMPSON, TAGGART, MO.

Genus making is the fashion now-a-days with a certain school of conchologists. Parties addicted to this work have access to good

libraries and an extensive collection of shells, and their whole aim in life seems to be making new genera. In some one of the older groups a few species are found, having a certain peculiar pattern of sculpture or coloring, or some little singularity in the fold of the columella or hinge teeth, and presto, a genus is formed and the science is burdened with another name!

These genus-makers never stop to see whether this slight peculiarity does not imperceptibly shade out into other species which are not as marked; this is no business of theirs; the main point seems to be the attaining of a sort of cheap reputation for scientific knowledge.

According to Tryon's Structural and Systematic Conchology, there were, at the time of its publication in round numbers, about 6,000 of these so-called genera, besides a great many synonyms, a number which has been largely increased since that date. Even the old genus *Helix*, without *Nanina* and *Zonites*, has some 200 of these names, many of which have never been characterized. No doubt our increasing knowledge and the good of the science has demanded that some of these older genera should be divided. In days gone by the name *Pyrula* embraced a large proportion of the marine univalve shells, having a short spire and lengthened canal, while *Fusus* included about all with a similar canal and elevated spire. So *Buccinum* was a miscellaneous group, characterized principally by a notch at the base of the aperture. As now generally recognized, *Pyrula* includes only pear-shaped shells of thin papyraceous structure, *Fusus* a sort of spindle-shaped species, and *Buccinum* a small, well-defined, perfectly natural group.

I am aware that those who favor this dismemberment of the older genera claim that many of these groups are too large for studying advantageously, and that the variation from the type of a genus is very gradual through long series of species, to forms which are so different from the type that no description will cover the whole, and the very ambiguous description of *Helix* is quoted as an example of this. Mr. Binney, in the Manual of American Land Shells, says: "In common with all who have studied the Pfeifferian genus *Helix*, I have long been convinced of the necessity of recognizing among its species numerous distinct genera. * * * Before recognizing these groups as distinct genera, I desire to wait until we can ascertain whether generic characters can be found in the jaws and lingual dentition, as well as in the shells. Convinced that characters cannot be found in these organs, or in the genitalia, I adopted, in that work,

(Terr. Moll., U.S.) the dismemberment of the genus so much demanded by the number of its species, founding the distinction on the shell alone."

It was as if the court had made up its mind beforehand, but had waited for the evidence to establish the decision, and when the evidence did not support it, the decree was rendered just as the court had intended all along. Many of these so-called genera of *Helix* have no value at all, and others so little as to be almost worthless for purposes of classification. Our well-known *Mesodon* runs into *Triodopsis*, and *Arionta* and *Aglaia* cannot always be separated. Tryon at one time placed *Helix devius*, Gould, in the genus *Mesodon*, and at another time he, as well as Mr. W. G. Binney, called it a *Triodopsis*. Tryon put *Arionta townsendiana*, Lea, in the genus *Mesodon*, and Mr. Binney regards *Aglaia hillebrandi*, Newc., as a varietal form of *Arionta mormonum*. And I might give such illustrations to the end of the chapter, all of which go to show that even among the savants these so-called genera are well nigh valueless.

But let us suppose that in any of the larger genera there is a chain of species varying from the type to those which are very unlike it; that the variation is very gradual throughout the species. I cannot see that dividing such a genus into a dozen, a hundred, or a thousand genera is going to help the matter or give us any clearer insight into the relationship of the species. I think that the classification should be founded on nature, or in other words, that nature should do the classifying, and that our efforts should be directed to deciphering the Old Dame's work. And if a distinction does not exist between certain so-called species and genera, it is useless to put it there, as it will simply require that somebody in the future, when the truth is reached, will have to throw it out.

The genus *Unio*, with its thousand species and endless variations, has been divided into a number of sub-genera by the genus makers; but a *Unio* is a *Unio* for all that, and the merest novice in conchology would recognize it as such in a moment; while probably not one conchologist in a hundred could tell a *Bariosta*, Raf., from a *Hyridella*, Swains. Dr. Isaac Lea showed his great knowledge of this subject when he grouped them into mere divisions founded on form and sculpture.

I think the time has come when a healthful reaction from this fever of creating genera and species should set in. Such work simply renders the science of conchology contemptible, and it is a veritable

stumbling block to the ranks of the beginners. To these the science should be rendered as simple and attractive as possible, and they should rather be encouraged than discouraged by a formidable array of names without meaning. No one but an expert, a closet naturalist, who sits in his snug alcove, surrounded by scientific books and collections, and who devotes his entire time to the study, can keep track of the names introduced by this mania, and I doubt if many of these can do it.

The old landmarks of the noble science are going one by one, and we should seek to fill the ranks from the young and enthusiastic, from those who have a living to make, and cannot devote their whole time to puzzling over a lot of names that even their authors did not comprehend, and only inflicted upon the world for the sake of gaining notoriety.

STRIÆ.

Paludina scalaris, Jay. Apropos of Mr. Pilsbry's interesting note on this species, I would call attention to the fact, which does not seem to be well understood, that *Ameria* has been shown *in toto* to belong not to the *Physidae*, where it was originally placed, but to the *Limnæidæ*. As there are rounded and carinate *Planorbis*, so there are rounded and carinate *Ameria*. Whether *Ameria* is more or less than a section of *Planorbis* is a question, but it seems to me that the high form of the shells is at least as well worthy of recognition by a name as *Gyraulus*, *Helisoma*, and other forms commonly so recognized. Whether *A. scalaris* belongs to the *Limnæinæ* or the *Planorbinae* should be easy of determination since the form of the tentacles would serve to decide this at a glance. Wm. H. Dall, Smithsonian Institution, Washington, D. C.

Patula cooperi, in Colorado and Utah. This interesting species is extremely common in parts of Colorado, and also, it would appear, in the Wahsatch Mountains of Utah, where it is accompanied by four others of the same group. It is decidedly variable and for reference it may be useful to class the principal varieties as follows: a. *typica*, the ordinary form in Colorado, with two distinct bands, diameter 19 to 25 mill.; b. *elevata*, spire elevated, Utah (Hemphill) and Colorado, a specimen found by Surface Creek, Delta Co., had alt., 12½, and diam. 16 mill; c. *minor*, very small, Utah (Hemphill); d. *confluens*, bands confluent, shell therefore brown with a broad white band above the periphery and a white umbilical region, Col-

orado, by the Grand River, in Garfield Co., and by Plateau Creek, in Mesa Co.; e. *trifasciata*, with three bands, one above the periphery and two below, all distinct, the area between the first band and the suture marbled with brown, Mam Mountains, Mesa Co., Colorado; f. *alba*, white with rough striae, Utah (Hemphill). Hemphill also mentions a white variety of *Patula strigosa*, Gld., from Utah, which may be called var. *alba*.

I have recently found *Cochlicopa lubrica* and *Hyalina radiatula* near here. Also *Limnaea truncatula* and two species of small *Pupae*, which may be new. Theo. D. A. Cockerell, West Cliff, Col.

ON the occurrence of *Limosina* in Texas. According to Prime, the species of this group are "widely and abundantly distributed through Central and South America and the West Indies," to the exclusion of the equally abundant species of *Sphærium* peculiar to the United States. Several years ago Mr. G. C. Heron sent me three specimens of a *Sphærium* from Cedar Creek, Hudson Co., Texas, whose unusual shape and mottled epidermis at once struck me as peculiar. On sending one of the specimens directly to Mr. H. A. Pilsbry, of the Philadelphia Academy of Natural Sciences, for identification, I was informed that he could not satisfactorily identify it with any known species, but that it was nearer to *L. cubense* Prime, than to anything else, although for the present the specific identity of the specimen must remain uncertain. The occurrence of this group, hitherto unknown to our fauna within the United States, would seem to be a fact worthy of record. Bryant Walker, Detroit, Mich.

H. (Fruticicola) similis, Fer., *Triodopsis appressa*, Say, *Stenogyra decollata*, L., in Bermuda. All three have been probably introduced in the past 25 years. During a recent visit, I found the first mentioned near the Government house in Hamilton. The second species was shown me by Miss A. M. Peniston, of The Flatts, who secured it from Mr. Bartram. It occurs near St. Georges. The last species is so common it threatens to become injurious to the crops there. It was introduced with some European plants, and first made its appearance at Mt. Longdon. *Stenogyra octona* Chem., is also found upon the island, and is not mentioned by Bland. T. H. Aldrich, Southern Ave., Cincinnati, Ohio.

In the *Western American Scientist* for April, p. 8, Mr. Berlin H. Wright has described as new, under the name of *Bulinulus hemphilli*, the species figured by Binney (Manual N. A. Land Shells, fig. 440) as a variety of *B. floridanus*. The form in question should be compared with *B. marielinus* Poey.

NOTES ON THE GENUS CYPRÆA.

BY JOHN H. CAMPBELL.

Since the publication of the latest monograph on the genus *Cypræa*—that by Mr. Roberts in Tryon's Manual of Conchology—four new species have been described, viz:—

Cypræa amphithales Melvill, *South Africa*.

Cypræa caput-draconis Melvill, *Hong-Kong*.

Cypræa Hungerfordii Sowerby, *Hong-Kong*.

Cypræa Rashleighana Melvill, *hab. unknown*.

Each of them has been described, apparently, from a single specimen, and it is not at all certain but that two of Mr. Melvill's species, *amphithales* and *caput-draconis* may turn out to be mere varieties.

In Mr. Melvill's "Survey of the genus *Cypræa*," reprinted in pamphlet form in Manchester, England, last year, a large number of new varieties of known species are described—some of them founded upon mere color variations. Most of them seem to me unnecessary additions to shell nomenclature. Tryon and Roberts recognized 146 species of *Cypræa* proper and 40 species of *Trivia*—making 186 species in the genus. Mr. Melvill, in his survey, differs with them upon some points. He changes *C. princeps*, Gray, to *C. valentia*, Perry; *C. undata*, Lam., to *C. diluculum*, Reeve; and *C. turdus*, Lam., to *C. ovata*, Perry; reduces from specific to varietal rank, *C. reticulata*, Martyn; *C. coxi*, Brazier; *C. polita* Roberts; *C. semiplota*, Mighels; *C. cernica*, Sowerby; *C. coxeni*, Cox; *C. sophie*, Brazier; *C. microdon*, Gray; *C. macula*, Adams; and *C. fuscomaculata*, Pease; and advances to specific rank the following varieties: *C. caput-anguis*, Phil.; *C. fabula*, Kiener; *C. coffea*, Sowerby; *C. menkeana*, Deshayes; *C. brevidentata*, Sowerby; *C. bregeriana*, Crosse; *C. comptoni*, Gray; *C. depauperata*, Sowerby; and *C. scabriuscula*, Gray.

I have lately received a fine specimen of *C. bregeriana*, Crosse, *New Caledonia*, from Mr. G. B. Sowerby, of London, who writes to me that he is now of the opinion that it is a good species and not a variety of *C. walkeri*, Gray, as he thought it to be when he published his monograph in the *Thesaurus*. Mr. Roberts also make it a variety of *C. walkeri*. Weinkauff and Melvill give it specific rank, as does also Mr. Richard C. Rossiter, of New Caledonia. I think it is, undoubtedly, a good species. The white specks are characteristic and are not found in *C. walkeri*.

A large series of specimens of *C. cervus* Linn. and *C. exanthema* Linn., which I have in my collection, leads me to doubt whether these two species are really distinct. No authentic localities outside of Panama and vicinity, West Indies, Florida and Southeastern United States are known in connection with either of them, and they are found indiscriminately in the localities named. A beautiful set of specimens of *C. cervus*, from the South Florida Keys, are in the Academy of Natural Sciences of Philadelphia. I have spec-

imens of both species from several localities in the West Indies, and the characters described in the books do not hold good to separate them. It is a pity that some naturalist has not examined the animals.

It is also doubtful if *C. exusta* Sowerby, and *C. talpa*, Linn, are distinct. I have a specimen of the typical *C. exusta* from Mr. Sowerby, and another which I received from Mr. Damon, of Weymouth, England, seems to me to connect the two species. Weinkauff may be right in making *C. exusta* a variety of *C. talpa*.

The opinion held by some that *C. decipiens* Smith, was a dwarf variety of *C. thersites* Gaskoin, has been definitely set at rest by Mr. Sowerby receiving last summer, a number of fine specimens of *C. decipiens* from Australia. I was fortunate enough to obtain one of them—probably the first specimen that has reached America. It is certainly a good species, and one of the most beautiful of all the Cypræas. The palm of beauty probably lies between it and *C. aurantium* Martyn. By the way, the fabulous prices given for the last-named shell are things of the past. Instead of costing anywhere from \$50 to \$100, a good specimen can be obtained for \$15, and the finest kind of one for \$20 to \$22. It is no longer a rare species, but can readily be obtained from any of the prominent shell-dealers of Europe.

Philadelphia, April 10, 1889.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

Chapter XLV.

SUB-ORDER INTEGRI-PALLIATA.

Siphons short, not retractile; pallial impression simple, without sinus. This sub-order, contains fifteen families.

FAMILY CYRENIDÆ.

Shell regular, oval or sub-trigonal, covered with an epidermis; hinge with two or three teeth in each valve; lateral teeth, two, simple or striated; ligament external; pallial impression simple, or with a short sinus.

This family has been made the special study of Mr. Temple Prime, a lawyer of N. Y. City, who is authority on this subject. He published, in 1865, a monograph of the species inhabiting the American Continent, illustrated with figures and giving all the synonyms, localities and other items of interest concerning them. In 1871 he published a catalogue of all the species in the world (of this family), known to date. He divided it into six genera and three hundred and twenty-two species, of which one hundred and eleven are American. There are now recognized seven genera and nearly four hun-

dred species. Four genera are represented in America, three in the U. S., and two in New England.

Genus *Sphærium*, Scopoli.

The genus *Sphærium* was characterized under its present name by Scopoli in 1777. It has borne some fourteen different names, but has been better known to conchologists, especially in Europe, by the name of *Cyclas*, given by Bruguière in 1792. Gray revived the name of *Sphærium* in 1847, and Mr. Prime was the first in America to recognize its claims. There are seventy-five species distributed world-wide; they are found in rivers, ponds, lakes and ditches, in fact, in all bodies of fresh water, but are more abundant in species and in individuals in the northern parts of our country than in any other section of the world. Four species inhabit Rhode Island, and possibly more.

170.—*Sphærium partumeium* Say.

I shall not attempt to give the synonymy of this, or any of the species of this genus, or of the next to follow; it would be a wearisome and a thankless task; these shells are so little known, and the animals inhabiting them have been so little studied that the synonymy is but an entangled mass of errors. For the benefit of those who might desire to study deeper into the subject, and to post themselves in regard to the views of authors who have written upon it, I would refer them to Prime's "Monograph of American Corbiculidæ," published by the Smithsonian Institution, at Washington, D. C., 1865.

Sphærium partumeium was first described by Say in Journ. Acad. Nat. Sci., Philadelphia, ii, 380, 1822, under the name of *Cyclas partumeia*. It is distributed all over the U. S., east of the Rocky Mountains, and its habitat is in stagnant pools and muddy ponds. The animal is of a delicate pink, and the syphonal tubes of the same color. The shell is rounded-oval, thin, fragile and pellucid; nearly equilateral; beaks central, calyculate approximate at the apex; epidermis glossy, light greenish or bluish in color; interior of valves light blue; hinge margin nearly straight, curving gradually into the anterior margin, but curving behind, so as to form an obtuse angle, causing the posterior side to appear broader; cardinal teeth strong; lateral teeth much elongated. The young shells are more compressed than the adult, and are of a light yellow color. Length of shell, 9-20, height, 2-5, breadth, 4-15 of an inch.

(To be continued.)

NUMEROUS publications received will be noticed in our next number.

THE NAUTILUS.

VOL. III.

JULY, 1889.

No. 3.

NOTE ON TWO HELICES NEW TO THE FAUNA OF THE UNITED STATES.

BY W. H. DALL.

SOME time since, among some shells from Southeastern Florida, received from Mr. G. W. Webster, two small *Helices* were noticed which a careful comparison with known U. S. forms failed to identify. By the kind intervention of Mr. H. A. Pilsbry, they were determined to be *H. (Microconus) caeca* Guppy, described from Trinidad, and *H. (M.) granum* Strebel, previously known from Mexico. This induced me to overhaul the small species in our collection to see if these forms had by any chance crept in under other names. The result was, that I found *H. granum*, which had hurriedly been referred to *Guppyia Gundlachi*, and *H. caeca* which had been left unnamed probably as the young of something else.

The localities now known in Florida for the above species are as follows:

H. caeca. St. Augustine. (C. H. Johnson.) Near St. John's River and near Lake Worth in East Florida, and near the Hillsborough River, emptying into Tampa Bay, West Florida (Mr. G. W. Webster). Mr. Webster identified this species as *H. diosoricola* C. B. Adams, described from Jamaica, and it is very probable that it is at most a slightly larger variety of it, in which case Adams' is the oldest name.

H. granum. Archer, Alachua Co., Fla. (Dall.); Evans' plantation, Rogers River (C. T. Simpson); vicinity of Lake Worth (G. W. Webster). When perfect this species is nearly the size of *H. labyrinthica*, very thin, reddish-brown, with very deep sutures

and a rather small, deep, tubular umbilicus. It is covered with beautiful oblique epidermal elevated ridges, which are easily lost, and do not agree with the lines of growth. The *H. caeca* is much smaller, olive-greenish, with a silky lustre and few inflated whorls the first of which is usually finely punctate.

The suture is very deep and the umbilicus proportionally larger than in *H. granum*.

ON A SINGULAR CASE OF IMITATION IN OSTREA VIRGINICA.

BY CHAS. T. SIMPSON.

I have before me a shell of *Cerithium atratum* about 18^{mm.} in length, which has attached to it and growing on the side of its spire a young *Ostrea virginica* about 10^{mm.} in length, and 6^{mm.} in width. There is nothing at all surprising in the fact that a young oyster should so attach itself to a *Cerithium* or any other shell, but it is surprising that the oyster should attempt to pass itself off for a part of the shell on which it grew. For, strangely enough, the upper valve of the oyster is sculptured exactly like the surface of the *Cerithium*. Each revolving ridge and nodule is repeated on the bivalve exactly as it is found on the spire of the shell on which it grows, just as perfect and distinct in every respect; the only difference being that they are not quite so strongly elevated as they are on the *Cerithium*.

Nor is this all. Not only is the sculpture repeated on the valve of the oyster, but the coloring of the *Cerithium* is carried over upon it; it being a yellowish-white throughout, covered with brown flecks and spots. When I first examined the shell I supposed that its spire had been injured, and that it had repaired it with an awkward patch; but only after the closest scrutiny did I discover the truth. Two other very small oysters had attached themselves to other parts of the shell, but as their upper valves were missing at the time I first examined it, I could not tell whether they had been similarly marked or not.

It is no uncommon thing for shells which attach themselves to others, to imitate those on which they grow; though I have never seen quite so remarkable a case as this. The shells of *Anomia glabra* and sometimes *Crepidula fornicata*, when growing on the *Pecten* imitate them by being ribbed, and *Crepidula plana* has often the texture of the interior or exterior of the shells on which it

grows, and sometimes *Crepidula convexa* which I found quite abundantly on *Modulus floridanus*, has the color and something of the corrugation of that shell, so that at first glance it appears to be merely a patch.

What is the object of this singular species of imitation? I believe without exception it is a means of protection against the rapacity of boring molluscs; one of the tricks which nature is constantly exhibiting by which the "survival of the fittest" is attained. The shells of the young oyster on the *Cerithium*, the *Crepidula convexa* on the *Modulus*, the *Anomias* and *Crepidulas* on the *Pectens*, were in every case thinner than those on which they grew, hence more liable to be pierced by carnivorous molluscs—but by imitating the shells on which they lived they stood a better chance of deceiving their enemies, a better chance of self-preservation. Does this not look almost like intelligence, almost akin to what we call thought in man—like reason; like studying from cause to effect? and I believe that such variation as this is often perhaps one of the first steps towards the formation of a new variety, a variation which if continued by circumstances fixes certain characters that define a species, and that these characters remain permanently—often after the causes which produced them have passed away.

LIST OF SHELLS OF THE NEW JERSEY COAST SOUTH OF
BRIGANTINE ISLAND.

BY JOHN FORD.

ED. NAUTILUS, Dear Sir:

As a list of the species of Mollusks found on the coast of New Jersey, South of Brigantine Island, may be of interest to your readers, I take the liberty of sending it.

If any others can be added it would be a pleasure to hear of them.

Yours truly,

JOHN FORD.

Phila. June 15th, 1889.

Anomia ephippium, Linn.

Arca pexata, Say.

Arca ponderosa, Say. (Fossil.)

Arca transversa, Say

- Astarte castanea*, Say.
Crepidula convexa, Say.
Crepidula fornicata, Linn.
Crepidula glauca, Say.
Crepidula plana, Say.
Columbella avara, Say.
Columbella lunata, Say.
Cytherea convexa, Say.
Donax fossor, Say.
Eupleura caudata, Say.
Fissurella alternata, Say.
Fulgur canaliculata, Say.
Fulgur carica, Gmel.
Fulgur perversum, Linn. (Dead.)
Littorina irrorata, Say.
Littorina littorea, Linn. (Dead.)
Littorina palliata, Say.
Lucina dentata, Wood.
Modiola plicatula, Lam.
Modiola tulipa, Lam. (Anglesea.)
Mactra solidissima, Chemn.
Martesia cuneiformis, Say.
Melampus bidentatus, Say.
Mya arenaria, Linn.
Mytilus edulis, Linn.
Nassa obsoleta, Say.
Nassa trivittata, Say.
Natica duplicata, Say.
Natica heros, Say.
Natica triseriata Say. (young of *N. heros*.)
Ostrea borealis, Lam.
Ostrea virginica, Lister.
Pandora gouldiana, Dall.
Pecten irradians, Lam.
Petricola pholadiformis, Lam.
Pholas crispata, Say.
Pholas costata, Linn.
Pholas truncata, Say.
Raeta canaliculata, Say.
Solecurtus costatus, Say.

Siliquaria gibba, Adams.

Solen ensis, Linn.

Tellina polita, Say.

Tellina tenera, Say.

Teredo navalis, Linn.

Urosalpinx cinerea, Say.

Venus mercenaria, Linn.

Venus mercenaria var. *notata*. Say.

Additional species found by other observers.

Anomia aculeata, Gmel.

Anomia electrica, Gld.

Bela harpularia, Couth.

Fasciolaria granosa, Brug.

Fusus tornatus, Gld.

Littorina rudis, Don.

Mactra lateralis, Say.

Macoma fusca, Say.

Mytilus hamatus, Say.

Scalaria angulata, Say.

Scalaria lineata, Say.

Sigaretus perspectivus, Say.

Solen viridis, Say.

Yoldia limatula, Say.

A MAMMOTH LAND SNAIL.

In the *West American Scientist* for April, 1889, under the head of "A New Florida *Bulimulus*," follows the description of an alleged species of the group above named the dimensions of which are given as "length, 19 inches, diameter 8 inches." I don't believe that my esteemed friend Hemphill ever collected a land animal of the molluscan type quite as large as this. I wish that he had and I am sure if a beast of this size exists anywhere on the planet, it should when found be named for him, for I know of no man more worthy of such an honor. Let us return to the big *Bulimus* and consider its dimensions and what these figures mean:

Bulimus ovatus of Müller, a Brazilian species "attains the length of six inches and is sold in the markets of Rio." It has an egg an inch in length when hatched, say the size of a robin's egg. With this for a standard, the nineteen inch fellow from Florida may be

expected under favorable circumstances and when not otherwise occupied to furnish eggs *three inches and upward* in length and of corresponding diameter. This looks like business, and here also is a hint in the way of a new industry. I was at one time slightly acquainted, with an old man, an alleged conchologist from the sunny land of France, of whom it was stated with much probability of truth, that he cooked common cowries in acid and bedeviled them in various ways, in the effort and hope to produce the beautiful *Cypræa aurantia* by an artificial process. His experiments were inspired not by scientific zeal but the lust of mammon. He did not succeed. His experiments rested on an imperfect ethical basis. But with the big *Bulimus* as above, provided one could get enough to start the business and stock a small cochlearia or snail ranch, the business would be interesting scientifically and commercially and in no way *contra bona mores*. The proportions of the dividends compared to the profits of other kinds of business, might not be quite as large as the proportions of the big *Bulimulus* compared with the rest of his relatives.

But alas there are many incongruities and paradoxes in this world, and with this melancholy fact before us let us rest and find consolation, while dreaming of omelets and custards made of *Bulimus* eggs; and let us also in kindness overlook the infelicities of typographic errors and lapses of proof-readers.

R. E. C. S.

ON THE GENUS *COROLLA* DALL.

BY W. H. DALL.

In 1871 I was suddenly called from my studies at the Smithsonian Institution to take charge of an expedition for a reconnaissance survey of the Aleutian Islands, under the auspices of the U. S. Coast Survey. The molluscan material collected by me in the Northern Pacific from 1865-'68 had been the object of much care and scrutiny. The types of all doubtful or supposed new species had been sent to Dr. P. P. Carpenter, then recognized as the chief expert on the shells of the N. W. Coast. He had held them without report for two years, but under the circumstances it was not possible to delay longer. They were hastily recalled, and that nearly four years of hardship and exploration might not seem entirely fruitless, the

most obviously new or interesting forms were made the subjects of brief diagnoses which were gathered into a paper for the American Journal of Conchology. This preliminary paper included a brief diagnosis of a remarkable Pteropod, of which the types are still extant in the National Museum, which was described (op. cit. vol. 7, pp. 137-8), under the name of *Corolla spectabilis* n. g. and sp., and supposed to have no shell. These animals caught in the N. Pacific, Lat. 42°50', W. Lon. 147°25', in the tow-net, were preserved alive for three days and carefully drawn to scale in water colors before being consigned to spirits for preservation. As they seemed lively and perfect the conclusion was natural that they were normally shellless. Subsequently, on my return to civilization in 1875, after much study I became convinced that these animals were more related to *Tiedmannia* but had lost their shell. The latter is gelatinous, slipper-shaped, and covered with small tubercles weighing several times as much as the animal, which is very slightly attached to it and is therefore detached with great facility. The genus *Gleba* Forskål was similarly described from a detached animal.

In his report on the *Pteropoda* of the Challenger Expedition, Dr. Paul Pelseneer received from me copies of all my unpublished sketches and specimens of several of the species, though not of *Corolla spectabilis* as the jar containing the latter was temporarily inaccessible. A brief description of the shell was also sent. In his report on the Challenger Pteropods he combines with my sketch and diagnosis certain defective fragments collected by the Challenger party which appeared to him to belong to the genus *Gleba*, to which he accordingly referred *C. spectabilis*; the name *Corolla* naturally becoming in this way a synonym of *Gleba*.

But the "shell" of *Gleba* is of a totally different character from that of *Corolla*. It is almost flat, shallow and not slipper-shaped. The detached "shells" which I took in the tow-net about the time I collected the types of *Corolla* do not resemble *Gleba*, but are nearly identical with those possessed by *Cymbulia calceola* Verrill, an analogous Atlantic species. The reception, from the Fish Commission, of specimens of *C. calceola* and of specimens of *Corolla spectabilis*, with the shell, from the Santa Barbara Channel, California, leave no doubt of this. The soft parts of these two species also differ materially from those of *Gleba*, and *C. calceola* has therefore been made by Dr. Pelseneer the type of a new group which he has named *Cymbuliopsis* (Challenger Pteropods, *Thecosomata* p. 100, fig.

2, 1887), which also includes *C. rata* Q. & G. With the identification of the true shell of *Corolla*, this name becomes unnecessary, and *Corolla* resumes the generic rank I assigned to it, with the addition of a second species, *Corolla calceola* Verrill (sp.) from the eastern coast of United States; *Cymbuliopsis* becoming in its turn a synonym. The details of structure I hope to publish later with illustrations; the object of this note is merely the rectification of the synonymy. In a general way I should be indisposed to claim priority for a name which was imperfectly characterized in publication, but Dr. Pelseneer has set the example by adopting *Gleba*, which stands in exactly the same predicament and as it is really the best plan (except in very glaring cases) to take the first identifiable name, I follow his example.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

173.—*Sphaerium sulcatum* Lam., 1818.

This, the largest species of the genus in America, is widely distributed throughout New England, and the Middle and Western States and Canada, and inhabits rivers and large ponds. It presents much variation in size and color. It has been known best in this country by the name of *Cyclas similis* Say, but Lamarek's name has priority. The animal is white with light orange siphons. The shell is transversely oval, nearly equilateral, very light for its size; valves convex, broad across the beaks, which are but slightly elevated above the general curve of the shell; interior bluish; exterior dark chestnut; surface concentrically wrinkled with strongly-raised lines, with a broader band corresponding to each year's growth. Length, $\frac{7}{10}$, height, $\frac{1}{2}$, breadth, $\frac{1}{3}$, inch. The young shells do not resemble the adults, and might well be mistaken for another species; they are thin and compressed, with both ends truncated and resemble rhomboideum; in fact most of the specimens in cabinets labeled rhomboideum are simply the young shells of *sulcatum*. The color of the young shells is lemon-yellow, but as they grow older a dark shade appears at the beaks and gradually spreads downwards until it covers the entire surface. In intermediate stages there is a yellow zone on the lower margin. They are found in R.

I. in the Ten Mile River, and are very abundant in the Blackstone.

Genus *Pisidium*, Pfeiffer, 1821.

This genus was confounded by earlier writers with *Tellina* (a marine genus) and still later with *Sphaerium*. Pfeiffer first observed the difference in both animal and shell and proposed the name of *Pisidium* for this group.

The animal of *Sphaerium* has the lobes of the mantle united posteriorly, into a tube, single at the base, but separated into two siphons at the extremities, while in *Pisidium* it is united its entire length.

The shells of *Sphaerium* have the beaks central, dividing the hinge margin into equal parts, and the cardinal teeth are situated immediately under the beaks; in *Pisidium* the beaks are terminal, *i. e.*, nearer the posterior extremity; the cardinal teeth also are terminal and the ligament is on the shorter side. The teeth of *Pisidium* are stronger and more robust in proportion to the size of the shell than in *Sphaerium*. The habits of the animals are the same, burrowing in mud or attached to the roots and stems of aquatic plants. The best time to collect these shells is from April to July.

There are eight species in New England, three of which have been found in R. I.

174.—*Pisidium abditum*, Haldeman.

Shell rounded-oval, elongated, margins well rounded; beaks small, raised a little above the curve of the shell; surface smooth, not distinctly striated; epidermis generally straw color, but sometimes dark and the surface rough and coarsely striated; cardinal teeth small, separate; the anterior one larger and prominent; lateral teeth short. Length, $\frac{1\frac{5}{16}}{100}$, height, $\frac{1\frac{4}{16}}{100}$, breadth, $\frac{9}{100}$, inch. Inhabits nearly all of North America, is very common and is found in swamps and on the margins of small streams.

P. aequilaterale, *compressum*, *ferrugineum*, and *ventricosum* are species which occur in Maine, Massachusetts and New York, but have never been found in R. I. They are widely distributed over other parts of the country and may possibly inhabit R. I., although not yet observed. *P. abditum* was described by Haldeman in Proc. Acad. Nat. Sci. Phila. i, 53, 1841, and has twenty-five synonymous names.

(To be continued.)

BRIEF NOTES ON THE LAND AND FRESH-WATER SHELLS OF MERCER COUNTY, ILL.

BY WILLIAM A. MARSH.

Sub-genus *Planorbula*, Haldeman.101.—*Segmentina armigera*, Say.

Shell varied in color, from very dark horn color to almost white, spire regular, slightly concave, suture well impressed, whorls four, longer than wide, carinated above, aperture oblique, labrum usually of a darker color on the edge. Within the aperture are five teeth, two on the pillar lip, one near the anterior lip, one on the side of the labrum, and two on the upper portion of the outer lip. This interesting shell has a range from Maine to Colorado. It is rather common here about our small ponds, being usually found associated with *P. exacutus* and *P. parvus*. It may be found adhering to sticks, bark and pieces of pine boards where the water is very shallow.

ANCYLUS Geoffrey, 1767.

102.—*Ancylus rivularis*, Say.

Shell pale yellow, opaque conic, depressed; apex obtuse, nearer to and leaning towards one side and one end; aperture oval, rather narrower at one end, entire. This shell is very abundant along the margin of the Mississippi River; found adhering to the limestone rock in the river, also on limbs of trees, dead leaves and old valves of Uniones. I have one valve of a *Unio ellipsis* in my cabinet that had 25 of the *Ancylus* on it.

103.—*Ancylus parallelus*, Haldeman.

Shell pale, thin, fragile, lengthened, narrow, apex rather short, sharp, conspicuous, with two-fifths of the shell posterior to it. Inhabits Pope Creek, in this county; has never been found elsewhere. When found at all it occurs very abundantly, adhering to sticks, stones and dried leaves. I have found it attached to live specimens of *Pleurocera subulare*.

104.—*Ancylus tardus*, Say.

Shell conic, depressed, apex behind the middle, obtuse, rounded, inclining backward, line from the apex to the posterior tip rectilinear; line from the apex to the anterior tip arcuated; aperture oval.

I found this shell in a small slough near Edwards Creek, in Green Township, adhering to flat limestone rocks. I have never found it in any other locality. It is probably very rare here.

GENERAL NOTES.

ON *HELIX* (*ARIONTA*) *KELLETTI* FBS.—Twenty years ago, Dr. J. G. Cooper, writing of the west coast helices, mentioned the finding of *Arionta Kellettii* Fbs., upon the seaward side of Point Loma, at the entrance of San Diego bay. He remarked upon the great number of dead shells and the scarcity of the living, from which it was inferred that they were dying out. The same state of affairs exists to day. The steep hillside is thickly strewn with dead shells of the form of *Arionta Kellettii*, now generally known as *A. Stearnsiana*, while living specimens are hard to find. The dead shells are in all stages, from fresh and bright to chalky and broken, showing that a comparatively small number of individuals are living at one time, yet enough survive to keep the race intact.—*E. W. ROPER.*

PUBLICATIONS RECEIVED.

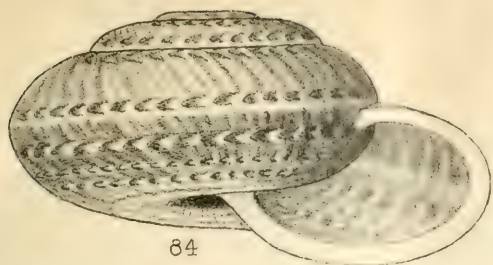
CONTRIBUTIONS FOR A SYSTEMATIC KNOWLEDGE OF THE AQUATIC SHELLS OF TASMANIA, by W. F. Petterd. In this valuable paper Mr. Petterd has revised the fresh-water shells of Tasmania, giving especial attention to the minute Paludinoid forms, which in Tasmania as everywhere have been very imperfectly understood. Most of them belong to the genus *Potamopyrgus* of Stimpson, a group including also all of the New Zealand non-marine Rissoids. The new subgenus *Beddomeia* (name preoccupied by Nevill, Handl. Moll. Ind. Mus. i, p. 127) is proposed for *Amnicola launcestonensis* Johnson, and other species, and *Brazieria* for the *Ampullaria tasmanica* Tenison-Woods. A number of new species are described and figured as well as the radulæ of various genera. The importance of work of this sort can hardly be over-estimated at the present stage of Malacology.—*H. A. P.*

ON CERTAIN PARASITES, COMMENSALS AND DOMICILIARES IN THE PEARL OYSTER, by R. E. C. Stearns. (Smithsonian Report, 1886, pt. 1, p. 339.) The author of this paper discusses in characteristically graceful style the interactions between parasites, domiciliares and

their hosts. By "domiciliares" are meant creatures which live upon or burrow in shells, "not for the purpose of getting at the softer parts of the mollusk upon whose shell they have 'squatted,' in order to use said soft parts for food, but solely for the purpose of a residence or domicile." Such are the pholads (*Penetella*) which stake out their mining claims on the *Haliotis rufescens*. But most extraordinary of all is the case of certain little fishes of the genera *Fierasjer* and *Oligocottus*. These little fellows enter the gaping shell of *Meleagrina*, impelled I suppose by greed for a meal or perhaps by a Pandora-like curiosity to see what is within the rough valve-lid. Once inside they "find no obstruction to their course as they push their way towards the interior between the mantle and the smooth inner surface of the valves until they approach the adductor muscle, and here they find a barrier which causes them to expend somewhat greater activity or energy, and in a corresponding degree disturb the serenity if not the structural economy of the oyster." And here the explorer is "entombed in pearl." Three plates accompany the paper, showing the struggling, tired, little minnows as neatly over laid with pearl as Chinese josses inside a *Dipsas* shell. *Oligocottus* has not previously been observed caught in this way.—*H. A. P.*

An excellent list of Rhode Island Mollusks by Mr. H. F. Carpenter has been received, and will be commented upon in the August NAUTILUS.

MOLLUSCA OF MINNESOTA, by Uly S. Grant. Another brief contribution to a knowledge of Minnesota Mollusks appears in the recently issued report of the Minn. Geol. and Nat. Hist. Survey. It includes notes on thirteen forms not before recognized in the State, besides additional remarks on species previously noted. It is understood that Mr. Grant will shortly have ready a revised annotated catalogue, bringing together the matter already published, and incorporating also notes on the material accumulated during the progress of the Survey. His personal field work during several seasons in the northern and other unfrequented portions of the State has no doubt brought to light many important facts.—*C. R. KEYES.*



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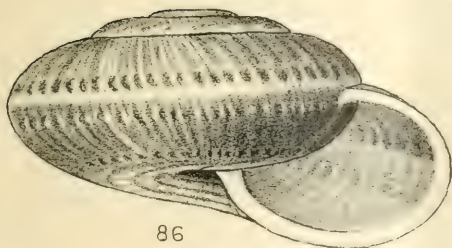
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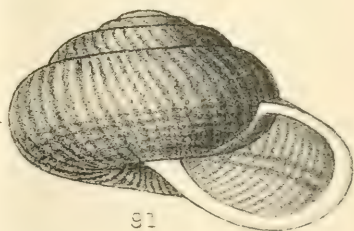
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would be an interesting task of Paleontology, to detect a fossil form, or forms, from which the recent ones are derived.

So far, it has not been possible to examine the soft parts and thus complete our knowledge and description of the species; but it is to be expected that the necessary fresh, if possible living specimens will be found, and I hereby would invite the active collectors of the north-western States to look specially for this Pupa, in order not only to make a complete examination, but also to know more about its geographical distribution, and possible variations.

Description.

Shell narrowly perforated, turritid-cylindrical, vitreous (or whitish), very minutely striate, shining; apex rather pointed; whorls 5, regularly increasing, well rounded, especially the upper ones, the last somewhat narrowed and a little ascending towards the aperture, compressed at the base but not carinated, at some distance from the outer margin provided with an oblique, rather prominent, acute crest corresponding in direction to the lines of growth, extending from the base to the suture, formed by a whitish callosity; behind the crest the whorl is flattened, and corresponding to the lower palatal lamella, impressed; aperture lateral, scarcely oblique, relatively small, inverted subovate, with a slight sinus at the upper part of the outer wall, margins approximated; peristome moderately reflected; lamellæ 6; one parietal, rather long, very high, in its middle part curved outward, towards the aperture bifurcated, the outer branch reaching the parietal wall; one columellar, longitudinal, rather high, its upper end turning in nearly a right angle towards the aperture, but not reaching the margin; basal exactly at the base, short, high, dentiform; 3 in the outer wall, viz.: the lower palatal long ending in the callus, highest at about its middle; the upper short, rather high on the callous; above the upper one supra-palatal, quite small, dentiform, nearer the margin.

Length 1·7 mill., diam. 0·8 mill. (·068 x ·032 inches).

As already stated, our species ranges beside *P. armifera* and *P. contracta* Say, standing nearer the latter. Yet it is different from this species by the shape of the aperture, the wanting callous* connecting the margins on the body whorl, by the longer crest behind the aperture, which in *contracta* disappears in about the middle of

* In many specimens of *P. contracta* so strongly developed, that the peristome is rendered continuous.

the (height of the) whorl, and by the wanting constriction, especially in the columellar wall, not to speak of the size and shape of the whole shell. The lamellæ also show some marked differences, such as the presence of a high basal, the shorter columellar not reaching the base, but with relatively larger horizontal part, the bifurcation of the parietal and the presence of a supra-palatal, the last just as it is in *P. armifera*.

It must be added here that the specimen first obtained from Minnesota in several respects differs from those found in Illinois and Iowa, which I consider as typical; by its size which is $\frac{1}{3}$ smaller, by the basal lamella developed in a peculiar way, being rather longer at the truncated top than at its foot, and by the stronger, thicker palatal lamellæ. Yet, as there was only one specimen, it was liable to be an individual peculiarity—even then of interest. Should, however, more specimens be found with the same configuration, they would represent a distinct and well characterized variety; possibly it is a peculiar northern form.

New Philadelphia, Ohio, June, 1889.

ON MR. PILSBRY'S CRITICS UPON SOME AMERICAN SHELLS.

BY C. F. ANCEY.

In the 9th No. of the *Conchologists' Exchange*, Vol. II, 1888, p. 113, Mr. H. A. Pilsbry wrote: "On *Lyogyrus*, Gill, and other American shells," in which several subgeneric and specific names proposed by European scientists for N. American shells, particularly by Dr. Westerlund and myself are sharply criticised. Of course criticism is good whenever errors generally diffused are to be destroyed, and when not inconsiderate. I intended, at first, to write about this subject in "*Le Naturaliste*," where "some of Mr. Crosse's genera are so rudely handled," but I at length determined to insert my article in the same paper as that in which Mr. Pilsbry published his own note, in order to be read by the same naturalists.

It will be remarked at first, that before speaking about the new species proposed by such a man as Dr. Westerlund, an eminent conchologist, and certainly, together with Dr. W. H. Dall, the one who is the best acquainted with the conchological fauna of the Arctic countries, it would be well to compare either his shells with authentic specimens of those formerly described, or his *very accurate*

descriptions to those of the published species. I fail to discover the identity of *Valvata mergella*, Westerlund with *Valvata striata*, Lewis. The proportions of the shell, number of whorls, elevation of the spire, etc., etc., are not the same in the two species. I must add that Dr. Westerlund was certainly acquainted with either *Valvata sincera* or *striata*, as in the description of his *mergella*, he alludes to the 5 already described North American forms!

I have recently described under the name of *Liogyrus Lehnerti*, a shell that was sent me some five years ago, by Mr. E. Lehnert, who discovered it in the Potomac, together with Gould's shell. The operculum which I have not seen, proved to be Amnicoloid, hence the species should be called *Amnicola Lehnerti*. It is a sinistrorse, not "distorted" shell, and owing to the number of specimens already known, it may be termed a constant form, for not counting my two typical examples, Mr. Lehnert sent some to Mrs. Geo. Andrews, who wrote about these, saying in was "indeed an interesting shell," and besides those he undoubtedly possesses in his own cabinet, Mr. H. A. Pilbry saw others that permitted him to ascertain its generic position. Distorted specimens are frequent, as the latter says, in fluviatile shells, but sinistrorse monstrosities are *very scarce*, and hitherto two or three species at most (*Limnea peregra*, *Melantho decisa*), normally dextral, have been found sinistral, and amongst these no *Amnicola*, although specimens of this genus are profusely distributed in suitable stations in Southern Europe, North Africa and North America. I hunted much for fluviatile shells in Europe, but never gathered any sinistral Amnicolæ and other fluviatile species, and frequently occurred to my notice trochoid or distorted specimens of *Planorbis*, some with part of the whorls entirely loose from the preceding ones; this I observed in *Planorbis nautilus*, *Planorbis complanatus*, and some of the allied species, also in a wonderful little shell found in 1884 by myself in the river named "Gave de Pau" in S. W. France, and perhaps a *Paladilhia*. (I never attempted to describe this single specimen, no other species of *Paladilhia*, having ever been discovered not even in that location by myself, but in that part of France, by other naturalists; hence I should reasonably suppose it is really new, as it is different from the other *Paladilhia* not only in this character, the last whorl being *entirely* detached, but still in shape.) The genus *Liogyrus*, Gill or "Lyogyrus" appears to possess this only conchological character (the last whorl loose from the preceding), by which it may be distinguished from some of the

species of *Valvatæ* possessing an elevated spire; hence this feature alone has but slight value, and I have always referred it to *Valvata* as a subgenus, before anything was known of its anatomy. The said character is not generic, even subgeneric, and I must remark that in the *same species*, chiefly in *Cyclostomidæ* (*Ostodes liberatus*, Mousson, for instance), the last whorl is more or less solute.

The two New Caledonia fluviatile shells, *Heterocyclus Perroquini* and *Valvata Petiti*, were originally generically separated by Mr. Crosse on account of this feature occurring in the former only, although the other ones are nearly the same in the two, namely that of the peristome being more or less expanded or reflected in both. This very striking particular alone should justify the distinctness of *Heterocyclus* from *Lyogyrus* or *Valvata*; but nothing of the anatomy being known we are not authorized to declare it generically separable, notwithstanding the locality, the two shells being restricted to the lakes of Southern New Caledonia.

In regard to *Thomsonia* and the only species, *carinifera*, Anc. (= *Physa* ("Paludina") *scalaris*, Jay), related to it, I must say, at first, that the subgeneric name proposed is *Thomsonia*, not *Thompsonia*, and should the latter be already preoccupied in another branch of Natural History, the name proposed would stand, being at least as much different from *Thompsonia*, as *Helix Raimondii*, Phil., is from *Helix Remondi*, Tryon, *Helix Raymondi*, Moq., etc. I must add that I am not aware that even *Thomsonia* is not also preoccupied in Zoölogy, for nobody is universal, and although having published on Entomology as well as Conchology, I have not particularly studied every part of Natural History; this should, I think, be a sufficient apology for giving such a name.

My excuse for changing the name of *Helix Harfordiana*, W. G. Binney (not J. G. Cooper) to *commutanda*, is that my paper was sent for printing when Tryon's name was still unpublished or rather when his work had not yet reached Europe. Similar facts commonly happen, and authors are, in this case, fairly excusable.

I will remark upon another observation in Mr. Pilsbry's article: "Although American Conchologists have not been finding 'new species' of fresh water shells in the Eastern States for the last decade or two, Continental writers, with delicious coolness, continue to describe 'novelties' from Massachusetts, Maryland and other well-known localities."

I never described shells from these localities, but we always must bear in mind the fact that N. American shells have never been treated in the same way that European. There is in America a tendency to restrain the specific forms, and not to admit a shell to specific rank before the animal, anatomic features and particularly dentition be known. The celebrated American scientist, Mr. W. G. Binney, several years since, wrote me about this, concluding that "our system may be a good one, but *that he wished to be consistent.*" In Europe, we admit to specific rank whenever a shell offers sufficient, even slight, but constant characters, should these characters be the result of station, food, climate, etc., such circumstances often being quite uneasy and generally impossible to determine.

Besides this, the Eastern States will doubtless afford a number of *small* new species, when the ponds, rivers, etc.—particularly in the drifts and alluvions—will be as much thoroughly explored as similar places have already been searched for in France, where quite unexpected forms of *Lartetia*, *Paludilhia*, *Moitessieria* in still better known localities are discovered, and where the mountainous countries daily yield an increasing number of *Zonitidæ*, *Pupidæ*, etc., hitherto not discovered by earlier conchologists *inhabiting the country.* A trip in the Pyrenean region in 1884 was very successful in this way, and amongst the novelties I then found, I may mention the fine *Hyalina Anceyi*, West., and the *Paludilhia*-like shell I have alluded to.

NOTE UPON MR. ANCEY'S CRITICISM.

BY H. A. PILSBRY.

Upon reading over my short article, written over a year ago, to which the above criticism is a reply, I find that I am prepared to stand by every word of it as far as matters of *fact* are concerned; and I feel confident that increased knowledge in the future will confirm my statements. I regret that it was so written as to seem to Mr. Ancey "inconsiderate." Nothing is more painful than a real or fancied violation of those amenities which should characterize all the relations between naturalists; and I am glad of this opportunity of expressing my esteem for Mr. Ancey, whose work and attainments are well known to all conchologists.

As to the points of difference between us, I would say that I have examined hundreds of *Valvata sincera* in all its varieties, and am certain that *V. striata* and "*V. mergella*" are nothing but extreme forms, which imperceptibly merge into the *sincera*. This is shown by numerous British American and U. S. specimens. *Lyogyrrus lehnerti* is a sinistral monstrosity, no more entitled to specific rank and name than the sinistral specimens occasionally found in every species of *Campeloma* (*Paludina*).

Both *Thompsonia* and *Thomsonia* are preoccupied as generic names in Zoology.

I take this occasion to correct a mistake of my own which apparently has mislead Mr. Ancey. Several years ago Prof. R. E. Call and the writer described a species of spiny rissoid from Texas as *Pyrgulopsis spinosus*. The shell really belongs to Stimpson's genus *Potamopyrgus*, as the writer pointed out a few months after the original publication. *Potamopyrgus* is largely represented in New Zealand, Australia and Tasmania, and also in the West Indies and adjacent mainland of Mexico, Central and South America. Wherever they are found, the species are nearly all subject to a dimorphism even more puzzling at first than that of the spiny forms of *Neritina* (*Clithon*). They may be either carinated above the periphery, the carina armed with a corona of spines, or else rounded, the superior aspect of the whorls completely smooth, rather flattened, and but slightly convex. In the case of *P. spinosus* C. and P., I have called the smooth form "*Hydrobia texana*," at that time not knowing the mutations to which these forms were subject. The *P. spinosus* has been figured by Strebel (*Mex. Land- u. Süßwasser Conchyl.*, pl. v, figs. 34, 34a) under the name of "*Hydrobia coronata*, Pfr." There are some differences between the Continental and Cuban forms, but all will probably prove identical, Von Martens having already united all of those known to him from the Americas, under the old name of *coronatus*, Pfr. The American species agree with the Australasian in the dentition, which is quite distinct from that of other rissoid forms. The presence of a species in Liberia, W. Africa, and of fossil forms of the same spiny type in S. European Tertiary strata shows that the group is ancient and wide-spread. Mr. Ancey (*Bull. Soc. Mal. France*, 1888, p. 185) has lately published an *Etude Monographique sur Pyrgulopsis*, in which he has included the American forms of *Potamopyrgus* known to him (but not one-half of the so-called species in our literature) in a section of *Pyrgulopsis*

which he calls *Pyrgophorus*; describing a number of new species from Nicaragua, probably all identical with either Pfeiffer's or Morelets' forms, the latter being apparently unknown to him. About a pint of these Nicaragua shells were sent to the writer a year or more since; the variability shown by them is extraordinary, and renders it doubtful whether more than one species of *Potamopyrgus* can be defined in America. *Pyrgophorus* Ancey, must become a synonym of *Potamopyrgus*.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

FAMILY CYPRINIDÆ.

This family contains but one genus and that genus but one species. This species, *Cyprina Islandica*, inhabits from the eastern end of Long Island to the Arctic Ocean, and from thence southward to England. It is said to have been found off Block Island in 29 fathoms' water, but is hardly entitled to a place in the "Shell-bearing Mollusca of Rhode Island."

FAMILY ISOCARDIIDÆ.

Three genera and twenty-three species, not represented in America, by living species, but there are several fossil species.

FAMILY CARDIIDÆ.

Five genera and over one hundred and fifty species, is represented in R. I. by two genera, each with a single species. The shells constituting this family are called Cockles. They abound in shallow water in sandy places and are used for food. They are also found in deeper water. One species, *Cardium edule* is collected in immense numbers in Great Britain, where they take the place of clams, which are as rare with them as Cockles are with us.

Genus *Cardium* Linné, 1758.

There are about one hundred species, distributed world wide. The genus is divided by some authors into several sections, into one of which, *Cerastoderma*, falls the only species which inhabits R. I.

177.—*Cardium pinnulatum*, Conrad. *

Shell small, sub-orbicular, beaks slightly elevated, surface dingy-white, with twenty-six ribs radiating from the beaks, separated from each other by deep grooves; on each rib is a series of equidistant arched scales or spines; interior flesh colored or white, furrowed to correspond with the exterior ribs. Length $\frac{1}{2}$, height 4-10, breadth 3-10. This pretty little shell is found generally in the stomachs of fishes. It inhabits from Long Island Sound to Labrador. It is rare in Long Island Sound, a little more abundant in Narragansett Bay and quite common in Buzzard's Bay and Vineyard Sound in four to twelve fathoms' water. Conrad found his specimens in Massachusetts Bay and described the species in Journ. Acad. Nat. Sci. Phila., vi, 260, 1831.

Genus *Laevicardium*, Swainson, 1840.

The genus *Cardium* has radiating ribs on the exterior which interlock at the margins. *Laevicardium* has a smooth surface, but most of the species have interlocking margins. There are twenty-one species of universal distribution, one of which inhabit R. I.

178.—*Laevicardium Mortonii*, Con.

Syns.

Cardium Mortonii, Con., DeKay, Stimp., Smith.

Liocardium Mortonii, Stimp., Dall, W. G. Binney.

Laevicardium Mortonii, Reeve, Tryon, Perkins.

Shell thin, sub-globose; beaks large, nearly central; surface smooth, glossy white, yellowish or fawn color; interior bright yellow, excepting the margins which are white, and a dark purple blotch on the posterior margin. Length one inch, height 9.10, breadth 7.10.

Described by T. A. Conrad at the same time with *Cardium pinnulatum*. It ranges from Cape Cod to Florida and the northern shores of the Gulf of Mexico. It is quite abundant in R. I. at times, and at others very scarce, although young specimens may be seen on our sandy shores at all times. The young shells usually have zigzag blotches of dark brown on the exterior surface, which disappears as the shell approaches maturity.

FAMILY VERTICORDIDÆ.

Not represented in America.

FAMILY CHAMIDÆ.

Not represented in the U. S. excepting as fossils.

FAMILY HIPPURITIDÆ.

(Order Rudistes, Lam.)

All the genera and species of this family are extinct.

FAMILY MEGALODONTIDÆ.

All fossil.

FAMILY TRIDACNIDÆ.

None in America.

(*To be continued.*)

GENERAL NOTES.

BYTHINIA TENTACULATA, LINN, IN OHIO.—Recently while collecting on Lake Erie, near Ashtabula Harbor, O., I found high up on the beach among the drift material, specimens of above named species. They were larger than those usually sent from Europe. Although the animals were dead the opercula were in place and the shells were free from wave and sand abrasion. Evidently they were cast up by a heavy sea. As this is an introduced species it is of general interest to learn when and where it was first introduced, the localities where it now abounds, and any facts relative to its natural distribution.—*Geo. J. Streator, Garrettsville, O.*

MR. S. RAYMOND ROBERTS, Treasurer of the Conchological Section of the Academy of Natural Sciences of Philadelphia, and author of various papers on the *Cypræidæ*, has removed to New York City.

MR. F. C. BAKER, formerly of Providence, R. I., is pursuing his studies at the Academy of Natural Sciences of Philadelphia.

ZONITES LIGERUS var. STONEL.—From Mr. Witmer Stone I have received a form of *Z. ligerus* differing from the type in having a concave, broadly excavated base, with comparatively wide umbilicus, collected by him in New Castle Co., Del. The axis in the type is barely perforated; but in this form it is a millimeter or more wide, and the base around it broadly concave.—*Pilsbry.*

PUBLICATIONS RECEIVED.

NOTES UPON A COLLECTION OF SHELLS FROM BORNEO WITH DESCRIPTIONS OF NEW SPECIES, by T. H. Aldrich. (From Journ. Cin. Soc. Nat. Hist.) *Paludomus lacunoides*, *Trochomorpha Kusana* (this is certainly a *Sitala*), *Alyceus broti* Aldrich, and *Clausilia dohertyi* Boettger are described as new. A well executed plate accompanies the text.—P.

NOTES ON QUEENSLAND LAND SHELLS, and NOTES ON THE HELICIDÆ, by C. Hedley. (From Proc. Roy. Soc. Queensl., 1889.) In these papers the genitalia, dentition and jaws of *Helix blomfieldi*, *fraseri*, *rainbirdi* and *pachystyla* are described and figured. It is highly gratifying to receive these valuable additions to our scant knowledge of the soft parts of Australian land shells.—P.

CATALOGUE OF THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND, by H. F. Carpenter. This catalogue is a supplement to the series of papers published in *Random Notes* and the *Conchologists' Exchange* by Mr. Carpenter. Two hundred and sixteen species are enumerated as actually inhabiting Rhode Island.—P.

REPORT ON THE MOLLUSCA of the "Blake" dredgings, pt. ii, *Gasteropoda and Scaphopoda*, by W. H. Dall. (Bull. Mus. Comp. Zool., vol. xvii, 8vo., pp. 492, 31 plates.) This Report together with that upon the 'Blake' Pelecypoda published about two years ago, constitutes, we do not hesitate to say, the most important single contribution ever made to American Malacology. More than this: the broad systematic and anatomical knowledge displayed, the substantial additions made to the morphology and phylogeny of Mollusca, give the work an interest to general biologist and specialist alike. Nearly 500 species, and 43 divisions of higher value are described as new. It is possible to indicate in this place, only a few points of especial interest.

The teeth of *Toxoglossa* are homologous with uncini of other Prosobranchs (p. 62). The line of descent and affinities of *Voluta*, *Lyria*, *Aurinia* and *Volutolites* is discussed (p. 144). The family *Triforidæ* is proposed for *Triforis* (p. 242). *Separatista* is placed in the family? *Adeorbidæ*. Our impression is that it will have to take to the road again. No two authors agree as to its family affinities. As to *Adeorbis* of authors, some of its species are certainly rhipidoglossate, while others belong close to or in the *Rissoidæ*. The true family characters of *Capulidæ* (*Capulus*) are stated (p. 286). An exhaustive discussion of the nomenclature of *Scalaria* Auct. is given

on p. 299 et seqq. The outcome is that the name *Scala* (Humph.) Auct. is used in place of *Scalaria*. Any naturalist who has puzzled over similar cases will appreciate the labor spent by Dr. Dall on these three pages of solid synonymy, and be glad to accept without question his result. The rhipidoglossate series is commenced with the limpet-like families *Scutellinidae*, *Addisoniidae*, *Cocculinidae*, families the elucidation of which is almost wholly due to Dr. Dall. On p. 351, *Turbo pulchellus* C.B. Ad. is said to be synonymous with the later name *Phasianella brevis* Ad. If this be a distinct species, it cannot, nevertheless, be called *P. pulchellus*, for that name is pre-occupied by Risso for a form of *Phas. pulla* recognized as a distinct variety by many European authors. The name *brevis* has also been twice used in *Phasianella*, both later than the date of Adam's species. The anatomical description of *Pleurotomaria*, and the parts relating to the Docoglossa and Chitons are especially interesting for the amount of wholly new information contained. We fail to see why Dr. Dall uses names admitted to be merely *sectional* or *subgeneric* in a generic sense in combination with his specific names throughout this work. The numerous plates are finely executed photo-lithographic reproductions of drawings by Dr. J. C. McConnell.

CONTRIBUTIONS TO SCIENCE, by C. J. Maynard. *Monograph of the genus Strophia*. This monograph seems to have been written without consulting the previous (somewhat extensive!) literature of the group. The author takes views of species rather narrower than we remember seeing this side of the Atlantic. In the dozen species described in this first fascicle perhaps not more than two or three, if that many, are really entitled to specific rank as species of this genus were understood by Pfeiffer. A casual inspection will convince any conchologist acquainted with *Strophia* that *S. pannosa*, *levigata*, *festiva*, *intermedia*, *fusca* and *nitela* Maynard are certainly one species; *S. cinerea*, *pallida* and *neglecta* Maynard = *S. glans* Küster; *S. picta* Mayn. = *marmorata* Pfr.; *S. ianthina* Mayn. = *alvearia* var. *rubicunda* Mke.; etc., etc. The author should consult the works of Leidy or Binney before publishing such figures of anatomy as those on plate ii of this work, or such explanations; fig. 10, for instance, is simply extraordinary (compare Leidy's figures of *S. incana* in *Terr. Moll.* i!). We trust that before a second fascicle of this "Monograph" appears, Mr. Maynard will consult either a collection in which a majority of the species are represented, or the works of Pfeiffer and other German and French authors on this genus, and indicate the differential characters of his species.

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No. 5.

NOTES ON *Physa triticea* OF LEA: ITS RELATIONS AND COMMENTS ON THE VARIATION, Etc., OF *Physæ*.

BY ROBERT E. C. STEARNS.

THIS California pond snail was described by Dr. Lea in 1856, from specimens collected by the late Dr. John B. Trask, in Shasta County. It was afterwards collected by Dr. J. G. Cooper inferentially in "South and East Oregon," as he adds these localities in his "Geographical Catalogue" to that previously given. In May, 1883, and subsequently, I detected it in springs in the vicinity of Auburn, in Placer County, at an elevation of about 1,300 feet, and collected at first between sixty and seventy specimens, subsequently more. It seems rather to have escaped the attention of collectors; or if found, has perhaps been labeled under some other name; as like nearly all, if not all, of the alleged species of *Physa*, it exhibits more or less variation when numbers of individuals are compared, even when such individuals are a part of the same colony.

The form to which Dr. Lea gave the name of *triticea* is, on the whole, rather persistent, and adheres quite closely to the type, as given in Binney *(figure 160); it is thirty-four hundredths (.34) of an inch in length. My specimens of the same length agree closely and generally with the figure, though the larger individuals, forty-six hundredths (.46) of an inch in length, exhibit some differentiation in the twist of the columella when compared with the smaller ones.

The largest are hardly typical, and though collected very near (within a half mile of) the smaller and more nearly typical forms,

* L. and F. W. Shells of North America, Part II, p. 94; S. I. Coll., No. 143.

were found living in one respect, at least, under a different condition. Without entering into a general revision of the North American *Physadæ*, a task which, sooner or later, will be required, I will state that I regard *P. triticea* as simply an immature aspect of the almost universally distributed *Physa gyrina*, and the larger specimens collected by me at Auburn, though smaller than the average of adult *gyrina*, connect the two.

The conditions under which the Auburn lots occur are as follows: The smaller, which would surely be placed with *triticea*, were collected close to springs, where the flow of water at its maximum is small, and its catchment is limited and confined in small hollows. A part of the year these springs must be quite dry, though most of the time yielding a feeble trickling stream. Colonies of *Physæ* became established hereabouts, but when mature, attain a size hardly equal to that of an ordinary *P. gyrina*, minus the final whorl, and showing the characters that *P. gyrina* exhibits from the apex down to and inclusive of the penultimate whorl. It is an arrested, undeveloped form, equal to *P. gyrina* adolescent. The larger Auburn specimens, though still exhibiting much of the aspect of *triticea*, indicate, as before implied, their relation to *gyrina*, and were collected where the flow of water is generally permanent and the quantity much greater than in the other instances, but still where there is not even a permanent pool, and no runway of water that could be called a permanent brook or streamlet.

The geological character of the region is a slate that is folded and tilted and tipped; it seems much more favorable to the formation of small springs than to permanent brooks and flowing streams, though the latter are occasionally met with, being fed by the melting snows of higher elevations.

The surface of the pond snails, which authors describe with a nicety that would be commendable if it were not so often absurd and embarrassing, varies exceedingly in texture, sculpture and color; adolescent individuals of the same species or colony may be pellucid, and mature ones opaque; young shells may have a smooth surface, and old ones exhibit growth lines; the surface in some may be even, in others malleated, and so on; and color is modified if the specimens, when collected and placed in water, are allowed to remain until maceration has reached a putrid stage, when the interior of the shell becomes blackened either by the adherence of decayed matter or by chemical discoloration; the membranaceous composi-

tion of the shell is also impaired and the limey portion made more conspicuous through its general bleaching effect and whitening of the callus of the columella. Mr. Tryon's *Physa politissima*, collected by Rev. J. Rowell, at Sacramento, and described and figured in Am. Journ. Conch., Vol. I, 1865, is probably one aspect of Lea's *P. triticea*. It is from a lower station, with an elevation variously stated as from thirty-one to eighty-two feet above sea level, and within the same drainage system.

The summing up of the foregoing leads to the conclusion that the first-named species (that made by Dr. Lea) is but a dwarfed and arrested aspect of *P. gyrina*, and Mr. Tryon's species is but another facies of the same.

Of the number of species that have been made upon characters that are simply those of adolescence, it would be interesting to know. Doubtless a great many, and not only among the fluviatile and lacustrine forms, but among marine forms also. This fact almost daily presents itself where one's routine work is the selection of specimens or examples for a great museum, and the determination of species from a great mass of material. Sometimes one is led to think that it is a pity, either that animals are not born fully grown, or that those who describe them do not bear in mind the fact that mollusks, etc., like men, have to advance by gradual growth from babyhood and the various stages of adolescence to maturity.

HELIX NEMORALIS IN VIRGINIA.

BY H. A. PILSBRY.

The *H. nemoralis* does not appear to have been naturalized in America except at Burlington, New Jersey, where it was introduced by Mr. W. G. Binney, many years ago. A short time since, I received a parcel of *nemoralis* shells from Prof. Jas. H. Morrison, of Lexington, Va. In response to a letter of inquiry Prof. Morrison gives the circumstances of its introduction as follows:

"The first specimen was found in the grounds of the Virginia Military Institute, in 1886, and was sent to Prof. Baird, who called it '*Helix hortensis*,' stating that this was a new locality. A few days afterwards I found quite a number of specimens and sent part of them to Mr. Tryon, who said they were '*Helix nemoralis*', and gave all the necessary information to establish this point. I found

upon examination that they were brought here in earth in flower pots, though from what locality I could not fix. The banded form was first introduced, like that in the top of the box sent by this mail. I have planted several colonies in this region and they have all done well and are breeding rapidly; as evidence of this I collected over 400 specimens in about one hour's time in a circle, the radius of which was not more than 25 yards. I send by this mail a small box containing the different varieties of color and stripe collected up to date. If you can give me the names of any parties who would be interested in them, it will give me great pleasure to send specimens."

The series comprises many of the band combinations seen in European specimens. The shells seem to be indistinguishable from natives of the old world. The English conchologists have attempted to catalogue and name the color varieties of these five-banded snails—the *Pentatenia* of Schmidt—and with a view to ascertaining just what forms are represented in America, I sent the specimens from Lexington to Mr. T. D. A. Cockerell, of West Cliff, Colorado, who kindly furnished me the list of some fifteen named forms. Mr. Cockerell writes: "The specimens could not in any way be distinguished from those of Europe. It will be interesting to compare another series with the present from the same locality five or ten years hence, and see whether the environment has greatly affected the variation. Indeed, it would be good to collect and catalogue say two hundred and fifty specimens every year, if they are numerous enough."

It would be interesting to observe whether the several color varieties intercross freely, or prefer to breed with individuals of their own color-pattern, and so perpetuate and intensify the color-races. If the latter be true, it will tend to establish the theory of "divergent evolution through cumulative segregation," by which Mr. Gulick explains the divergence of the numerous species of *Achatinella* inhabiting the same districts of the Sandwich Islands, and living apparently under identical environments.

SCALARIA ANGULATA IN NEW JERSEY.

ED. NAUTILUS, Dear Sir:

In response to the request appended to the catalogue of Southern New Jersey Marine Shells, published in the July number of the

NAUTILUS, I have received from Mr. Uselma C. Smith, of Philadelphia, a fine specimen of *Scalaria turricula* Sowb. found by him at Anglesea, New Jersey, July 20, 1889. This is essentially a West Indian species, and, so far as can be learned, has not heretofore been secured north of Jacksonville, Florida, where the specimen now in the Philad'a Academy was collected by Gen'l. F. E. Spinner.

Quite a number of *Scalaria angulata* Say, were also secured by Mr. Smith and son, at the same time and place. These were all "dead shells" but in excellent condition.

Although Prof. A. E. Verrill has reported this species as "occurring on the outer beach of Egg Harbor" it must have appeared there very rarely indeed, as the writer has searched that particular beach many scores of times during the last twenty-five years without discovering a vestige of it.

With this single exception there appears to be no authentic evidence of its presence on the New Jersey coast prior to the date above given. The finding of *S. turricula* so far North together with living *Modiola tulipa* Lam. suggests the presence of other West Indian forms in the same locality. For this reason it is hoped that collectors who have the opportunity will make a thorough search of that part of the coast especially.

Mr. Smith's discovery near the same point of living *Littorina littoria* Linn, is also of interest to the student, as it probably is the most southern locality from which these well-known denizens of the rocky coasts of New England have been reported.

JOHN FORD.

Philadelphia, July, 1889.

NOTES ON FLORIDAN SHELLS.

BY F. C. BAKER.

While pursuing Conchological studies at Micco, Brevard Co., Florida, this last winter, I had opportunity to compare the species which are common to both the Northern and Southern shores.

The little *Gemma gemma* Totten, I found quite plentiful in the Indian River, and specimens of *Bulla solitaria* Say, were not uncommon. *Cylichna oryza* Totten, and *Utriculus canaliculatus* Say, both species being common at the North, were taken in considerable quantity in the dredge.

I was very much surprised to find in one of my hauls with the dredge, a number of very perfect specimens of *Turbonilla interrupta* Totten, associated with *Odostomia interrupta* Say, and also *Nucula proxima* Say.

One of the most abundant Mollusks of the South seems to be *Melongena corona* Gmel. This shell is to be found upon the salt marshes (Savannas) in great numbers, and of all sizes from a half inch in length to over four inches, and through all degrees of perfection. I collected one day in a single hour 360 of these shells comprising one of the finest series of this mollusk that could be imagined. I noticed among them a number of specimens having a double row of spines, all the way around the whorls. This variety has been named *bispinosa* by Philippi but the characters are not constant and the name therefore does not stand.

SUMMER STUDIES IN CONCHOLOGY.

BY PROF. JOSIAH KEEP.

For several years past a class in Conchology has been connected with the Chautauqua Assembly at Pacific Grove, Monterey, Cal. This Assembly meets annually about July 1, and continues its sessions for the space of two weeks. During this time there are numerous lectures, concerts, and other intellectual exercises, many of which are of a high grade of excellence. Such a programme, given at this delightful watering place, naturally attracts many visitors beside those who are engaged in the regular Chautauqua course of studies. The past season has been no exception, but the interest has been deeper and the attendance larger than on any previous occasion.

The science classes were mostly held at nine o'clock in the morning, and were followed by a public lecture. Excursions to the beach were made at various times, particularly in the early morning, in order to take advantage of the very low tides which occur then, about the time of the new and the full moon.

The class in Conchology was no respecter of persons in regard to age or occupation. Around the tables on which our shells were spread were seated matrons with gray hair, boys and girls, young men and women, ministers of the gospel, teachers from our schools, here a young man from the farm, and beside him a mother leaving

for a little the duties of home. Perhaps in all the country, a similar class with a similar object could not be found.

And that object was the study of mollusks, particularly those species which were to be found in the immediate vicinity. Not so much a critical examination and discussion of the fine points of difference between similar species, but first of all a study of the structure and nature of the soft parts of the animal, then the mode of growth of the shell, the names of its parts, and its general morphology. After this, as far as time permitted, a study of the local species, and of others which have their home on adjacent parts of the coast. The apparatus was of the simplest kind. One morning a quantity of limpets were brought in for examination. Some were put into jars of sea-water and their motions observed. Others were deprived of life by a fresh-water bath, and distributed around the tables. After an examination of the foot, mantle, head, etc., penknives were used to slit the head, and common pins were employed to dissect out the buccal mass. A microscope was at hand to show the sharp teeth, and many were the expressions of surprise and interest in connection with the whole lesson. Valuable suggestions were made by members of the class, and many cabinets of shells were begun or received additions.

After a start had been made, the writer's book, "West Coast Shells," was freely used. Descriptions were read, engravings examined, and pronunciations recommended. On the tables were spread numerous examples of dry shells, many of them imperfect, just as they had been gathered from the beach. From these mixed piles the members of the class drew out specimens of the shell under consideration at any particular time, and were given such hints and directions as would tend to fix its main features in the mind, and guard them on the one hand from confounding it with similar species, and on the other from separating it from its brethren on account of mere varietal differences.

The two weeks of study passed all too quickly, but even in that brief time good results were obtained. Not results of a critical nature, not important contributions to the science; very few have the ability or the opportunity to accomplish these. But our science ought not to be simply for the scholar and the specialist. The people in the common walks of life have a keen sense of the beautiful, and the interesting features of common objects have but to be pointed out to be appreciated. Life is made more rich and full as

new admiration is evoked, and what is better fitted to call it forth than a careful study of the beautiful objects of nature. Moreover, observation is quickened, interest aroused, and knowledge is increased. The danger which lies in the spread of popular science is not found in the contemplation of real facts and real objects, even if they are studied but slightly; it must be sought, rather, in the substitution of fancies for facts, and a superficial reading or hearing about things instead of an examination of the things themselves.

Among other good results of the session was the formation of a club of subscribers for THE NAUTILUS, with the prospect of additional names in the future, as its merits become known.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

FAMILY LUCINIDÆ.

This family contains about one hundred and fifty species, distributed chiefly in the tropical and temperate seas, on muddy and sandy bottom from low water to the deepest water inhabited by the mollusca. Several of the genera are entirely fossil.

Genus *Lucina*, Brug., 1792.

There are two hundred and fifty fossil species and one hundred living. Distribution universal.

179.—*Lucina* (*Cyclas*) *dentata*., Wood, 1817.

Syns.:

Lucina divaricata, Gld. Lam. non Linné. *L. strigilla*, Stimp., *L. americana*, C. B. Adams, *L. chemnitzii*, Phil., *L. lamarekii*, Dunker, *L. eburnea*, Reeve, *L. Pilula*, C. B. Adams, *L. ornata*, Reeve, *L. quadrisulcata*, D'Orb., *Pectunculus parvus*, Lister, *Tellina divaricata*, Gmel. Chemn. Dillw. Turton, *Cyclas dentata*, Dall, Tryon, Verrill, etc.

Shell white, thin, orbicular, convex, sub-equipartite; beaks central, elevated, inclined forward; surface glossy and sculptured in a very peculiar manner, with grooves bent obliquely downwards from a line drawn, not through the center, but from a point at the anterior third; they extend to the margins and crenulate the

edge; hinge teeth small, one in the right valve and two in the left; lateral teeth rudimentary, almost obsolete; concentric lines of growth very strongly marked. Length 1 inch, height $\frac{2}{10}$, breadth $\frac{1}{10}$.

Linnaeus in 1767, described an European shell under the name of *divaricata*. Lamarek in 1818 and his followers, supposing our shell to be identical with that of Linnaeus, called it by the same name. The above list of synonyms does not include all the names given by authors to this shell, for several others, besides those quoted, on discovering that our shell was a distinct species, hasten to give it a new name without troubling themselves to ascertain whether or not any one else had previously made the same discovery. Our species has the greatest geographical distribution of any known shell, but does not inhabit Europe. It inhabits from Cape Cod to Brazil, nearly all the Pacific coast of North and South America, the eastern coast of Asia, Seychelles, Isl. Bourbon and Australia, and not only found living, but also as fossils in nearly all these widely separated localities. It lives in deep water and I have never seen a living specimen in Rhode Island, although single valves are plenty on Block Island, Newport and Narragansett Pier.

Another species, *Lucina filosa*, inhabiting from Massachusetts Bay to Nova Scotia, has been found some distance off Block Island in 29 fathoms in sandy mud, but I think is hardly entitled to a place among the "Shell-bearing Mollusca of Rhode Island."

Cryptodon Gouldii, another species of the *Lucinidae* family, inhabiting deep water and also taken from the stomachs of Codfish, was found at the same time and place with *Lucina filosa*; also a new species, *Cryptodon obesus*, A. E. Verrill, described by him in *American Journal of Science*, 111, 221, 1872.

FAMILY UNGULINIDÆ.

Not represented on our shores.

FAMILY ERYCINIDÆ.

This family contains twelve genera, three of which are represented in New England, *Montacuta*, *Lepton* and *Kellia*. Species of *Montacuta* and *Lepton* inhabit the shores north of Cape Cod and have been found in New Bedford Harbor, but no species representing this family have been found in Rhode Island excepting this:

180.—*Kellia planulata*, Stimpson.

Syn.:

Kellia rubra, Gould, not of Montague.

Shell small, solid, sub-oval, inequipartite, compressed; beaks large, in contact, having before them a deep elongated, smooth areola; both ends broadly rounded; surface covered with a thick, dirty brown epidermis, eroded at the beaks; interior glossy white. Length $\frac{1}{2}$, height $\frac{1}{3}$, breadth $\frac{1}{2}$ inch.

Inhabits from Long Island Sound to Greenland, from 1 to 15 fathoms in depth. Also under stones at low-water mark and attached to the roots of seaweeds. I have found but two specimens in Rhode Island, both dead, collected in shell sand above high water mark.

FAMILY SOLEMYIDÆ.

This family contains one genus and six species, two of which inhabit Rhode Island.

181.—*Solemya borealis*, Totten.

Syn.:

Solenomya borealis, Perkins, Verrill.

Shell elongated-oblong, thin and fragile, covered with an epidermis which extends beyond the margins of the shell, except on the hinge margin, where it is lapped over and connects the valves together its entire length; the epidermis is scalloped where it projects beyond the shell, by slits corresponding to the radiating lines on the surface, extending from the beaks to the edges of the margins; the epidermis is dark brown and the radiating lines are lighter in color, fifteen to twenty in number; interior grayish-blue. Length two inches, height $\frac{3}{4}$.

Col. Joseph G. Totten found this species in the vicinity of Newport, Rhode Island and described it in Silliman's Journal, xxvi, 366, 1834. It has never been seen in our bay excepting at Newport, but has been found at Chelsea, Nahant, Portland and other ocean shores of New England.

182.—*Solemya velum*, Say.

Syn.:

Solenomya velum, Perkins, Verrill.

This species inhabits from North Carolina to Nova Scotia. It was described by Thos. Say from specimens found on the southern coast

in 1822, in the Journ. Acad. Nat. Sci., Phila., ii, p. 317. It resembles the previous species very closely, but is distinguished from it as follows: The shell is much smaller, being only one inch in length, half an inch in height, and $\frac{3}{10}$ in breadth. The valves are more convex, thinner and more transparent, the epidermis is pale yellowish-brown and the interior purplish-white; the scalloped edges of the epidermis are rounded, while in *borealis* they have a square appearance, very thin at the ends and rolled back. In young specimens the epidermis is entire (not slit as in the older ones). It is not a very common species but is found quite plentifully in March and April in Narragansett Bay. They live at and below low water in sand and in mud.

FAMILY CRASSATELLIDÆ.

Not represented in North America.

FAMILY ASTARTIDÆ.

This family is divided into two sub-families, Astartinæ and Carditinæ.

SUB-FAMILY ASTARTINÆ.

This family contains fifteen genera, thirteen of which are fossil.

(*To be continued.*)

GENERAL NOTES.

Mr. W. G. BINNEY has in preparation a Third Supplement to the *Terrestrial mollusks vol. V*, in which it is purposed to bring the subject up to date, and figure and describe the species discovered since the publication of the Second Supplement two years ago.

HYALINA STERKII DALL. A tiny species of *Conulus* or *Hyalina* discovered by Dr. V. Sterki in Ohio, is described by Dr. Dall in Proc. U. S. Nat. Mus. 1889 (separate copy received Aug. 24). It is scarcely over a millimeter in diameter, and about a half that height. It will be figured in a later number of THE NAUTILUS.

HEMPHILLIA AND PROPHYSAON have both been collected by Henry Hemphill at Old Mission, Cœur d'Alene, Idaho. (W. G. Binney, in letter to Ed.) This extends the range of these peculiar slugs considerably eastward. In this part of the Northwest many other Pacific slope forms extend eastward and mingle with the East American types.

CYPRÆA VENUSTA Sowb. ("*C. thatcheri*" Cox) is commented upon by Dr. J. C. Cox, in Proc. Linn. Soc. N. S. Wales, 1889, p. 187. A variety having much the appearance of *C. thesites* in coloration is described and figured. It differs considerably from the type of *C. thatcheri*. The granular slate-colored sides meet in front and behind, in front of the channels, and form a complete circle round the shell, and the dorsal surface inclosed is ornamented with very dark geographically bounded, variously shaped portions, mostly rounded with tapering offshoots, while the intervening spaces are of the normal bluish-amber color of the type of *C. thatcheri*.

SHELLS NEW to the United States fauna. We have recently received from Mr. J. A. Singley a number of species new to the U. S. fauna collected by him in Southern Texas. They will be described in the October NAUTILUS. Other new forms are *Zonites selenitoides* Pils., a species like *Z. minusculus* but larger, with strongly costate surface (like *Selenites duranti*), from California, and *Pupa calamitosa* Pilsbry, a tiny but very distinct form from San Diego and from mouth of the San Tomas River, L. Cal.—P.

SHELL COLLECTING IN SOUTHERN TEXAS. The following extracts from a letter received by the Editor from Mr. Singley, will be of interest to "field-conchologists."

"This is an unfavorable year for collecting fresh-water shells. There has been rise after rise in all the streams which makes it awkward for the collector.

"At New Braunfels where I found *Planorbis Liebmanii* abundant last fall I could not find a specimen either of the two times I visited it. The lower Rio Grande is no good for land and fresh water-shells. The river is simply a mass of shifting sand—the channel may be here to-day and half a mile away the next rise. No Uniones are found in it whatever, and only a few in the lakes or waterholes over the country; and as for land shells, I was out in the woods every day for about six weeks and hardly a day passed that I did not search for shells. The sending to-day will show you with what poor success. *Bulinulus* is common enough but other species are like Angels' visits.

"I found Corpus Christi vicinity a better place for *Unio* than lower down; but I failed to find the *Microphysa incrustata*, and other species that are said to occur there, even after searching the Nueces bottoms for about 20 miles at different points up the river. The dearth of shells at such (apparently) promising localities is disheartening."

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No. 6.

RECENT ADDITIONS TO THE UNITED STATES SNAIL FAUNA.

BY H. A. PILSBRY.

[NOTE.—The plate illustrating this paper will accompany the concluding part in the next number of THE NAUTILUS.]

PUPA calamitosa n. sp. Figs. 6, 7.

Shell minute, cylindrical, very blunt at apex, chestnut-colored; whorls $4\frac{1}{2}$, the first one and one-half smooth, the following regularly costulate-striate, the costulae separated by spaces wider than themselves; last whorl abruptly turning forward, rounded beneath, encircled by a slight central constriction or furrow; aperture about one-third the total length of shell, rounded, truncated above, contracted within; peristome thin, expanded, without crest or callous thickening behind; columellar margin rather dilated; parietal wall bearing two entering lamellae, one arising near the termination of the outer lip, the other more deep-seated, elevated, entering less obliquely; columella with a strong white deep-seated obliquely entering fold; outer lip with two short white lamellae.

Alt. 1.70, diam. .80 mill.

Two trays of this tiny species are before me. One received from Henry Hemphill, collected near the mouth of San Tomas river, Lower California, the other collected by Oreutt near San Diego, Cal. Most specimens show the widening inward of the outer lip shown in the figure. Several specimens have only one lamella on the outer lip, and are rather larger than the typical form described, measuring 1.90 mill. alt. The second parietal lamella is usually much larger than the first, but in one or two specimens before me

this is not the case. The umbilical rimation terminates in a tiny depression, perhaps perforated, at the axis. The formula of denticles or folds would be (according to Dr. Sterki's scheme) AABDE or AABE. The species is of a decidedly different type from any other American *Pupa*. *P. californica*, *hordeacea* and other West coast forms being quite different. The former is closely allied to the group of *decora*, *rowelli*, *corpulenta*; the latter to *P. rupicola* and *pellucida*.

Another new Lower California *Pupa* will be described in the next number of THE NAUTILUS.

PATULA (PTYCHOPATULA) cæca Guppy.

This species has been noticed and briefly described by Dr. Dall in THE NAUTILUS for July, 1889, p. 25. The specimens before me are from Hidalgo, Texas, collected by Mr. Singley. It is also in the Philadelphia Academy collection from Trinidad and Costa Rica, and Dr. Dall reports it from Florida. The Texas shells are 2 mill. high and about the same diameter. The *Helix punctum* of Morelet (1851) is very close to this species, probably identical; *H. dioscoricola* Ad. (1845) is also very similar, and, if the same, has priority.

As a section of the genus *Patula* I recently proposed the name *Ptychopatula*. The group includes those minute conoidal Neotropical Helices, with acute thin lip, nearly circular or broad-lunate aperture, thin texture, opaque or nearly so, and generally delicately ribbed obliquely. The species are much more narrowly perforated than *Patula* or *Microconus*. Some of the species have been referred by authors to *Acanthinula*, others to *Conulus*, *Pyramidula* (a European section), etc. The type is *Helix cæca* Guppy. The following forms group around this type: *H. punctum* Morelet, *H. dioscoricola* C. B. Ad. (these three probably identical); *H. ierensis* Guppy, *H. granum* Strebel and Pfeffer, *H. cæcoides* Tate, *H. plagioptycha* Shutt. (these four very closely allied, the last three perhaps identical). The position of this section is next to *Microphysa* in the genus *Patula*. The dentition of *H. cæca* has been figured by Binney. (*Ann. N. Y. Acad. Sci.*, iii, p. 113, pl. 5, Fig. 1, under the name "*Helix* ——. Costa Rica. Dr. W. M. Gabb."). It is similar to that of *Microphysa vortex* Pfr.

ZONITES (*Guppya* ?) *gundlachi* Pfr.

This species is now for the first time recorded from west of the Gulf. Mr. Singley collected it at Hidalgo, Texas.

PATULA (*Microphysa*) *incrustedata* Poey.

Found by Mr. Singley at Hidalgo, Texas. Heretofore recorded from Galveston and Corpus Christi. At the former locality I was unable to find the species when there several years ago; and Mr. Singley writes me that he did not get it at the last-named place, although special search was made.

My attention has been called to the fact that the name *Microphysa* is preoccupied. If a change is necessary, it is likely that we can use *Thysanophora* Strebel and Pfeffer for the section. It was proposed for Mexican species which are essentially similar to the West Indian forms.

PLANORBIS *cultratus* d'Orbigny. Figures 1, 2, 3.

This is a small form, flatter than any other United States species, very acutely keeled at the circumference; outer whorl convex above (considering the shell dextral), the spire slightly concave; *almost perfectly flat beneath*. There are about $4\frac{1}{2}$ whorls on the largest specimen before me, very slowly and regularly widening (seen from beneath); the aperture is oblique, narrow, angular. The surface is finely marked by growth-striae and has the faintest possible indications of spiral sulci near the peripheral keel. Diameter 4 mill.; altitude .65 mill. The specimens are from Hidalgo, Texas, sent by Mr. Singley. The species has been found in the Mexican State of Vera Cruz, in Guatemala and Venezuela. It was described from Cuba. The insular form is decidedly larger than the Mexican shells, or than ours, measuring 9 mill. diam. For the bibliography of the species consult Crosse & Fischer, *Moll. Mex. et l'Amer. Cent.*, vol. ii, p. 68; Strebel *Beitrag zur Kenntniss der Fauna Mex.*, p. 46, (as "*Planorbis* nov. spec?"); and Orbigny's *Mollusques de Cuba*.

Mr. Ralph Tate in his article on Nicaragua shells (in *Amer. Journ. Conch.*, vol. v, p. 158) calls this species "*P. kermatoides*." One of his specimens is before me. The real *kermatoides* Orb. is a much larger shell.

ANCYLUS excentricus Morelet. Figures 4, 5.

This is an *Ancylus* with more excentric apex than any heretofore known in the United States. The apex is one-fourth the length from the posterior end, and so strongly inclined to the right as to be about midway between a median line and the right border. The shell is horn-colored, fragile, oval, a trifle narrower behind; in outline the profile is convex in front of the apex, concave behind it. There are *slight indications* of the most delicate riblets radiating from the apex. Length 4, diam. 3, alt. 1.1 mill. Three specimens collected by Mr. Singley in Comal Creek at New Braunfels, Comal Co., Texas. The range of this species includes Guatemala, Nicaragua, Costa Rica. It has not been reported from Mexico. The identity of the Texas shells with the Central American is reasonably certain. I have compared specimens. Crosse and Fischer's figures are a trifle slenderer posteriorly, but undoubtedly represent this species.

(*To be continued.*)

CRITIQUES AND COMMENTS.

IN Mr. Carpenter's article, "The Shell-bearing Mollusca of Rhode Island," in the August NAUTILUS, page 45, he mentions the "Family Verticordiidae," and says "not represented in America." While the Verticordiidae are not shore shells, nor even shallow water forms, they cannot be regarded as exotic unless Mr. Carpenter's America is restricted to the littoral and laminarian zones of the main-land, and such a restriction would be absurd. Prof. Verrill reports *Verticordia* from off Martha's Vineyard and several species occur at various depths, from Vineyard Sound, southerly, along and off the coast of the Atlantic States to Florida and the Antillean region; and not only on the eastern side of North America, but on the Pacific as well, where Dall collected specimens in the vicinity of, or at, Catalina Island in the Santa Barbara Channel, California.

On page 46 occurs the following: "Family Chamidae;" on this Mr. Carpenter comments "not represented in the U. S., excepting by fossils." This will be a queer surprise to the large number of collectors who have found the beautiful *Chama arcinella* Linn., not uncommon, on the beaches of Florida, and not so frequently the less attractive shells of the roughly sculptured *C. macrophylla* Linn., and the *Chama florida* of Lamarek (= *C. sarda* Rve.), to say nothing of other alleged species, some of which probably fall to the rear of those

above named, in the usual procession of synonyms. On the coast of California we find three species: *C. exogyra* Conr., *C. pellucida* Sby., and *C. spinosa* Sby., all of the foregoing having been collected by me personally, without going outside of Uncle Sam's farm.

Since writing the above, the September NAUTILUS has come to hand. From page 57 I quote "Family Ungulinidæ. Not represented on our shores." If, by "our shores," he means Rhode Island, strictly and literally, he may be right, but if "our shores" means the North American Continent or the coasts of the United States, he is again in error, for the said family includes, among other genera, *Cryptodon* Turton, *Diplodonta* of Brown (= *Mysia* Leach), etc., and some authors include *Tellinmya* in the same family. Several species of *Cryptodon* inhabit the waters of the Atlantic coast from the Arctic Sea to Cape Florida, at various depths from six to nearly one thousand fathoms. *Tellinmya* is represented by three species from the Arctic Sea to Hatteras and one of these, *T. elevata* Stimpson, has been collected from two fathoms depth, coast of Maine. *Diplodonta* furnishes examples of three or four species on the west coast of N. America, one, perhaps two, of which, have been collected by my own hands. *Felania*, another group of the Ungulinidæ, furnishes two or three species on the Pacific side to justify this criticism. *Cryptodon* (which Mr. Carpenter mentions incidentally in connection with the *Lucinida*) and *Tellinmya*, it may be pleaded, have only quite recently been included in the *Ungulinida*; this can not be said of the groups *Diplodonta* and *Felania*.

Further on (page 59) may be seen "Family *Crassatellidæ*, not represented in North America." Now Dall has described a *Crassatella*, *C. floridana*, from the Gulf of Mexico west of the Florida coast (30 fms.), and said family is further represented by *Eriphyla lunulata* Conrad and variety *parva* C. B. Ad., both of which range from Cape Cod to Barbadoes, in from three to about three hundred fathoms. It may again be pleaded perhaps with reason, that a part of these latter facts have but very recently been made known.

The occurrence of *Crassatella* on the West coast of North America should have been known to him, for *C. gibbosa* Sby. appears in Philip Carpenter's Check List of West Coast Shells (Smithsonian Misc. Pub., June, 1860), an easily accessible publication: as will be seen by the date issued twenty-nine years ago.

Again, while highly appreciating the convenience and value of authentic local faunal lists, in Mr. Carpenter's, I do not perceive the

motive for, or any advantage in, his referring to the families or groups *that do not occur* in Rhode Island; for, in a list of shells that are found within any limited area, it goes without saying, that those species, groups, or families that are not listed or mentioned *do not occur*. The two hundred and sixteen (216) species enumerated as occurring in the very limited area of Rhode Island, is so small a part of the total molluscan fauna of the globe, and the proportion of families represented by said small number of species, is so small by comparison with the *total* number of molluscan families, that the inclusion of the non-represented families in his Rhode Island list, would, propriety considered, require the title to be changed so as to read, "List of Molluscan families, etc., not represented in Rhode Island," otherwise the suggestion arises that considering the size of the dog the tail is rather extensive; a homely but expressive illustration. It is of little value, from the point of geographical distribution, to know *what is not* in a place or region; the value of local lists is their telling us *what is*.

In Mr. Ford's "List of Shells of the New Jersey Coast, etc.," on pages 27-29 of the July NAUTILUS, he includes *Fasciolaria granosa* Brug. I am not aware, and I have been unable to discover, that Brugiere ever described a species of *Fasciolaria*. Broderip described *Fasciolaria granosa*, a Pacific coast form that inhabits Panama Bay and the general region thereabout. I should be pleased to know what shell has been erroneously listed under said name.

[Mr. Ford included *F. granosa* among species he had not himself seen, and which he considered doubtful. Ed.]

In the Century Dictionary, illustrative of the word *Abalone*, a figure doubtless representing some species of *Haliotis* (perhaps intended for *H. corrugata*), is given, with the title underneath "Abalone or Ear-shell;" this would be well enough if the following had not been added: "*(Haliotis tuberculata)*." Now the figure, while it fills the first half of the measure as may be seen in the title I have quoted, does not meet the requirements when the specific name is given, for *it is not* a figure of *tuberculata*, as any one can see who is at all familiar with the shells of the *Haliotidae*.

R. E. C. S.

Washington, September 20, 1889.

NOTES ON VALVATA (LYOGYRUS) BROWNII.

BY H. F. CARPENTER.

This species was found abundantly in Cunliff's Pond, at Elmville, three or four miles south of Providence, adhering to stones and empty valves of *Unio complanatus*. I discovered them in 1870 and kept more than two hundred specimens alive all summer in a glass globe filled with water. I read a description of it under the name of *Amnicola Brownii* before a meeting of the Providence Franklin Society, Tuesday evening, Mar. 26th, 1872, and published the same in the "Central Falls Weekly Visitor" the following week. The specific name was given in honor of Dr. W. O. Brown, who was then President of the Society. Specimens was sent to the late Geo. W. Tryon, who pronounced them to be a new species of *Valvata*, subgenus *Lyogyrus*. Of late years they have been gradually growing scarcer and the last time I examined the pond I could find none, although I did not search very thoroughly. Specimens of these shells are in the collections of Mr. John Ford, of Philadelphia, Mr. F. C. Baker, Mr. J. M. Southwick and several other conchologists. The following is my original description:

"Shell small, thin, translucent, of a light green color, when divested of the thick, dirty epidermis which covers it, turreted, elongate, composed of five gibbous whorls; operculated and umbilicated; apex very obtuse; suture very deep; aperture nearly circular, a little broader at the base; lip continuous, simple, the superior edge of the inner lip not touching the preceding whorl, except in young specimens. Average size $\frac{1}{10}$ inch in length, by $\frac{1}{14}$ in breadth. Diameter of aperture $\frac{1}{25}$ inch. Full grown specimens which are rare, attain a length of $\frac{3}{20}$ inch.

ON ANODONTA FLUVIATILIS DILLW.

The following letter received from Gen. de Peyster is interesting as showing the facility with which fresh-water mollusks become established in suitable spots.

UPPER RED HOOK, N. Y., Sept. 19, '89.

MR. DE PEYSTER:

Dear Sir:

At Dover Plains, Eastern Dutchess Co., N. Y., last week I secured sixty-three specimens of *A. fluviatilis*, including twenty-five or more

young, small shells, which I will place in some water suitable for their growth and propagation. Among the rest are two or three of good size, while all are well suited for the cabinet.

The largest example I have observed is an imperfect dead valve, which, with its other half, measured originally as follows: Transversely, $6\frac{3}{4}$; vertically, $3\frac{3}{4}$; and in thickness $2\frac{3}{4}$ inches. I have no doubt that some have been found of still larger dimensions; was told that such had been taken, but after diligent inquiry failed to get trace of them.

Regarding the place of their occurrence, I can give the following: About two and one-half miles south of Dover Plains, on the farm of Mr. Geo. Preston, is a swamp near the outlet of which a considerable quantity of peat was dug thirty or more years ago. The hole thus formed is about 100 feet by 40 in length and breadth, and 4 feet deep, and serves as a basin to collect some of the drainage of the marsh, it being filled with water and perhaps three feet of black mud deposited during the intervening time: from this is raked in limited numbers specimens of this *Anodon*, extraordinary for their luxuriant growth and beautiful coloring.

That this whole tract of about twelve acres was originally a shallow lake there is no question. Its former outlines are seemingly well defined; it lies encircled by hills of upturned calcareous and micaceous rocks; a narrow opening on the north has afforded an avenue of escape for its imprisoned waters. The swamp has no inlet but is springy over its entire surface, and at present is overgrown with shrubbery and small trees. Its outlet is a small ditch which empties into the Weebutook, or Ten Mile River—a tributary of the Housatonic, about three-eighths of a mile distant, making a descent of fifty feet in its course. Underneath the stratum of peat is a bed of marl a couple of feet in thickness, consisting of fresh-water shells—species of *Sphaerium*, *Limnaea*, *Physa* and *Planorbis*, which lived ages ago.

Whether any of these bivalves were noticed while digging peat, is impossible to say, but believe it is only eight or ten years since they have attracted attention, and this because the muskrats were bringing them to light; many recently broken shells are lying about the shore—brought up by these rodents.

I could not find any other fresh-water shells in the pond, but obtained about the marsh quite a number of interesting land-snails, among them the following: *Mesodon albolabris*, *M. thyroides*,

Patula alternata, *Zonites arboreus*, *Z. fulvus*, *Vallonia pulchella*, *Succinea obliqua*, *S. ovalis*, *S. avara*, *Pupa armifera*, *P. pentodon*, *P. corticaria*, *Vertigo Bollesiana*, *V. contracta* and *Carychium exiguum*.

Of *Pupa armifera* it is the first time I have found it in this County.

The above are facts, the several questions arising concerning the presence of these clams here I will not answer.

Have they worked their way from the river during comparatively recent years? or are they a sort of living connecting link between the lake era and the present?

Yours very truly,

W. S. TEATOR.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

Genus *Astarte*, Sowerby, 1816.

This genus contains twenty species; eight of these inhabit the coast of New England, from Cape Cod to Greenland, and three have been found south of Cape Cod, although none of them have actually been discovered in Rhode Island waters as yet.

183.—*Astarte castanea*, Say.

Syns.:

Venus castanea, Say.

Crassina castanea, Lam. Hanley.

Crassina sulcata, Brown.

Venus sulcata, Mont., Maton and Rackett.

Shell thick and solid, sub-orbicular; beaks elevated and much eroded, nearly central; lunule in front of the beaks deeply excavated; surface not strongly waved as in most species of the genus, but only slightly undulated, covered with a light-brown epidermis, excepting on the posterior portion, where it is almost black; hinge strong; ligament small; valves with one stout tooth in the right valve, and two in the left; margin crenulated in adult shells. Length one inch; height one inch; breadth $\frac{1}{2}$.

Gould says: "The foot of the animal is of a bright vermillion color and when seen protruded, one would hardly persuade himself that a red wafer was not embraced by the valves.

Habitat from Great Egg Harbor, N. J., to Nova Scotia. Common on the shores of Long Island, Nantucket, Martha's Vineyard and Cape Cod. Abundant in Massachusetts Bay. It should be found on the ocean shores of Rhode Island from Watch Hill to Newport, and also on Block Island.

184.—*Astarte quadrans*, Gould.

Shell small, nearly triangular; basal edge sharp and rounded; anterior more oblique and longer than the posterior; beaks central, pointed and eroded; surface smooth; epidermis light yellowish-olive; interior bluish-white, glossy; margin not crenulated. Length $\frac{3}{16}$; height $\frac{8}{10}$; breadth $\frac{1}{10}$ inch.

Described by Dr. A. A. Gould in the *Invertebrata of Mass.*, p. 81, 1841, from specimens obtained from the stomachs of fishes caught in Massachusetts Bay. It is a rare shell but has been quoted from Stonington, Connecticut, to the Gulf of St. Lawrence.

185.—*Astarte undata*, Gould.

This name was given provisionally by Gould to a variety of *A. sulcata*, described in his first edition of the *Invert. of Mass.*, p. 80. Binney in the second edition, 1870; p. 119, repeats the same remarks, but all later authors accept the name of *undata*.

Astarte sulcata is an European species described in 1778 by Da Costa, *British Conch.*, under the name of *Pectunculus sulcatus*. Gould, supposing our shell to be identical with the English one, called it by the same name, giving a list of ten or more synonyms, none of which apply to our shell, as it is a distinct species.

Prof. A. E. Verrill in *Silliman's Journal* for April, 1872, p. 213, remarks as follows: "This is by far the most abundant species on the northern coast of New England. It ranges from Cape Cod to Labrador. In the Bay of Fundy it is very abundant at all depths from three to one hundred and twenty-five fathoms on muddy bottoms. It varies greatly in form and sculpture, but can easily be recognized in all its varieties by any one familiar with the species of this genus. The beaks are less prominent and the lunule less deeply excavated than in *A. sulcata*, and other differences exist in the hinge, etc."

The figure in the second edition of Gould is not characteristic, the drawing having been made from an old eroded specimen of unusual if not abnormal form.

Astarte lutea, Perkins, described in Proc. Bost. Soc. Nat. Hist., xiii, 150, 1869, as a new species from New Haven, Connecticut, is a variety of *A. undata*, Gould. This species has been dredged in Newport Harbor and various other places south of Cape Cod.

SUB-FAMILY CARDITINÆ.

This Sub-family contains fourteen genera, six of which are fossil. Of the remaining genera, one only, *Venericardia*, inhabits the coasts New England.

186.—*Venericardia* (*Cyclocardia*) *borealis*, Conrad.

Syns.:

Cardita borealis, Con. Reeve, De Kay, Stimp., etc.

Actinobolus borealis, H. & A. Adams.

Arcturus rudis, Humph., MSS.

Cardita vestita, Desh.

(*To be continued.*)

NEW PUBLICATIONS.

MISSION SCIENTIFIQUE au Mexique et dans l'Amerique Centrale, *Etudes sur les Mollusques terrestres et fluviatiles*, by M M. P. Fischer and H. Crosse. The fascicle of this magnificent work last issued contains part of the *Cyclophoridae* and the *Cyclostomatidae*, with several plates illustrating the *Ampullariidae*. Of particular interest is the discussion (p. 148-150) of the genus *Cyclotus*. The authors purpose the name *Neocyclotus* for a genus to comprise all of the American *Cyclophoridae* with sharp lip and solid calcareous many-whorled operculum; these shells have heretofore been called *Cyclotus* in American collections. The anatomy is fully worked out. The following groups of exclusively Mexican species are also fully described and illustrated: *Tomocyclus* C. & F. (containing Mexican species formerly referred to *Megalomastoma*), *Habropoma* C. & F. and *Amphicyclotus* C. & F. (for species referred by previous authors to *Cyclophorus*). The plates, drawn by Arnoul, are superb. Messrs. Fischer and Crosse are to be congratulated on the progress of this magnificent work, indispensable to students of the tropical American fauna.—P.

NOMENCLATURE AND CHECK-LIST of North American Land Shells, by H. A. Pilsbry. (From Proc. A. N. S., Phila.) A pamphlet of twenty pages, containing a complete list of United

States species, including a number of species not contained in the latest monographs. The geographical range of each form is given, and the whole prefaced by a brief discussion of recent or original changes in nomenclature. Collectors of American shells will find the list a convenient one for checking their collections and their *desiderata* when exchanging.

UEBER DIE BEZIEHUNGEN *einiger europäischer und nordamerikanischer Pupiden*, by Dr. V. Sterki. (In *Nachrichtsblatt d. deutschen Mal. Gesell.*, Juli-Aug., 1889.) Dr. Sterki discusses the Pupæ common to America and Europe in this valuable paper. Species immediately allied to *P. muscorum* are *P. blandi* (doubtfully distinct), and *P. sterri* Voith; the last seem to the writer to be also a form of *muscorum*. The species is a mountain form, described from Bavaria. *Vertigo simplex* and *P. alticola* are considered synonyms of *P. edentula* Drap. The examination of the *Vertigo* species, Dr. Sterki says "hat mich viel Zeit, Mühe und 'Augenmörderei' gekostet;" and it is no wonder, as anybody who has been so rash as to trouble themselves with those ridiculously little creatures will bear testimony. The question of the identity of *V. antivertigo* Dr. and *ovata* Say, is discussed; and finally the new subgenus *Augustula* is proposed. The principal characters are the narrowing of the last whorl, peculiar constriction behind the peristome, the longitudinal position of the columellar fold, and the long, narrow, high fold, arising deep in the throat, and in *venetzi* uniting with the upper, in *miliu* with the lower palatal fold. It contains only the two species named.—P.

NOTES ON SOME INDIAN TERRITORY SHELLS, by Charles Torrey Simpson. An interesting paper, adding considerable to our knowledge of the distribution of the shells of this region. *H. (Triodopsis) copei* Wetherby, formerly known from Eastern Texas, was found in the Territory. A form of *H. (Polygyra) jacksoni* with elevated deltoid parietal tooth is described as var. *deltoides*. *H. (Mesodon) Kiowaënsis*, a form intermediate between *thyroides* and *sayii* is described as new, and the rare *Helicodiscus fimbriatus* is reported from near Fort Gibson. The shells described by Mr. Simpson under the name *Zonites capsella* are quite distinct from that species, as I have satisfied myself by careful comparisons. It may be called *Z. Simpsoni*, in honor of the finder. Mr. Simpson's remarks on the *Bulimulus dealbatus*, *schiedeanus* and *alternatus* should direct the attention of collectors to these forms, which are believed by Mr. S. to be varieties of a single variable species.

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THE VIRGINIA COLONY OF *HELIX NEMORALIS*.

BY T. D. A. COCKERELL.

Perhaps some of your readers, when they see the long list below of varieties differing only slightly from one another, will think it a case of much ado about nothing, and wonder where the interest can be in such minute differences of color or banding.

In these days it ought to be unnecessary to apologise for going into precise detail in scientific matters, but I will venture to point out that the present case is one of quite exceptional interest.

Here we have an exceedingly variable species, whose varieties have been extensively studied in its native country—Europe, and found to differ greatly according to locality and circumstances. A few of these varieties may be traced to definite causes—most of them appear to occur causelessly, which is another way of saying that the cause is, in these cases, as yet unknown. A highly variable species, then, is introduced into a new continent, where climatic and other conditions differ markedly from those of its native home. It is certain to vary—it varies everywhere—will it not, then, be influenced in its variation by the new environment, and produce, perhaps, new and unheard-of forms? And if so, shall we not thereby have a valuable clue to the nature of these forms, and the general principles which underly the phenomena of variation in this and perhaps in other species? In the endeavor to answer these questions I shall feel excused, both now and hereafter, if I seem to go into these matters more minutely than is usual with conchological work. Myself, I believe that in the noting of minute differences

lies everywhere our best chance of ascertaining the principles of evolution.

The varieties of *Helix nemoralis* are classified according to the following principles: First, variation in the ground-color of the shell, with the name *libellula* for yellow shells, *rubella* for pink shells, *petiveria* for pale brown or fawn-colored shells, etc. Secondly, variation in the banding, for which a band-formula is used. The typical shell has five bands, three above the periphery and two below, and its formula is accordingly 12345. If a band is missing, a 0 is placed in its stead—thus 12045 has the third band of the type missing, while 00000 is the formula for a bandless shell. If two or more bands are coalesced, they are bracketed together, thus, 12(345). If a band is imperfectly developed, it is indicated as a small figure below the line, thus, 12₃45. If a band is split into two, the number is repeated, as 1233(45), while an extra band which cannot be assigned to any of the usual five, is represented by an X, as 003X00. The formula should always be taken from near the mouth of the shell. These, then, are the ordinary kinds of variation, while other unusual characters are expressed in suitable terms, as *tenuis* for a very thin variety, *compressa* for a depressed form, *minor* for a small form, *albolabiata* for a white-lipped shell, etc. These terms are used in conjunction with one another, to indicate the different peculiarities of any given shell. The band-formulæ express themselves, and need not, as a rule, have the name of their author quoted after them. But in introducing these band-varieties to the American fauna, I have given the names of their first recorders, as a hint to their history in Europe. For certain of them, I have given special names bestowed by French authors—as *brissonia* for *petiveria* 12345. If these names are to be adopted, it will be necessary to bestow many new ones, as a large number of combinations have not come under the notice of the aforesaid authors, but to my mind it is more convenient to use the band-formulæ in conjunction with the color-names. There is only one thing to be said for the names given to combinations, that if misprinted they can hardly lead to any real confusion, whereas band-formulæ may be misprinted easily enough in such a way as to lead to erroneous records, which may never be corrected.

All the shells of *H. nemoralis* I have seen from the colony at Lexington, Va., were collected by Prof. J. H. Morrison, and number altogether 103. The first consignment, sent me through Mr. H. A.

Pilsbry, was rather disappointing, in that it consisted entirely of well-known European varieties; but more recently a larger collection sent by Prof. Morrison has presented several forms of great interest, showing a general tendency to the splitting-up of the bands, as in *Helix multilineata*. The following is a list of the whole lot, with the numbers of specimens of each:

No. of Specimens.

- (1.) *libellula* 00000 = *libellula* Risso. 14.
- (2.) *libellula* (12345) = *Kleinia* Moquin-Tandon . . . 5.
- (3.) *libellula* 12345 Fenn. 1.
- (4.) *libellula* 12345 = *quinquefasciata* Moq. = the
type 14.

(Two of these have a white rib, and thus fall also under *bimarginata* Picard.)

- (5.) *libellula* 1233(45) Chem. 1.
- (6.) *libellula* 123X45 Ckll. (X is a mere line, 4 is
very broad) 1.
- (7.) *libellula* 123X(45) var. nov. 2.
- (8.) *libellula* 123_x(45) var. nov. 1.
- (9.) *libellula* 123₄555 var. nov. 1.
- (10.) *libellula* 12_{3xx}(45) var. nov. 1.
- (11.) *libellula* 0₂₂345 var. nov. 1.
- (12.) *libellula* 123(45) = *reaumuria* Moq. (Some
shows the least sign of a band between
2 and 3) 17.
- (13.) *libellula* 10345 = *argentvillea* Moq. (2 are also
bimarginata) 11.
- (14.) *libellula* 12(345) Kreglinger 1.
- (15.) *libellula* (12)3(45) = *poiretia* Moq. 3.
- (16.) *libellula* 1233₃45 var. nov. 1.
- (17.) *libellula* 1₂₂345 var. nov. 1.
- (18.) *libellula* 10045 Kregl. = *Sionnestia* Locard. . . 1.
- (19.) *libellula* 12₃45 v. nov. 1.

(This is new only in the sense of being unpublished. I have seen it with a pink ground-color (*rubella*) from Truro, Cornwall, England, collected by Mr. J. H. James.)

- (20.) *libellula* 00345 = *listeria* Moq. 1.
- (21.) *libellula* 10345 Ckll. 2.
- (22.) *libellula* 12045 = *favannea* Moq. 3.

- (4.) *libellula* 10045 v. nov. (two specimens.)
 (5.) *libellula* 12_{xx}345 v. nov.
 (6.) *libellula* 12X345 v. nov. (juv.)
 (7.) *libellula* 123₃45 v. nov.
 (8.) *libellula* 10300 v. nov., but also British. (juv.)
 (9.) *libellula* (123)(45) = *gronovia* Moq. In Europe, this variety is found in France, England, and Wales, and the Rev. A. Dean recently sent me examples of it from the Tyrol, and from the Pyrenees..
 (10.) *libellula* 1(23)(45) = *brardia* Moq. (juv.)
 (11.) *libellula* 1(23₃)_x(45) v. nov. (juv.)
 (12.) *libellula* 123₃45 v. nov. (juv.)
 (13.) *libellula* 000_{xxx}00 v. nov.
 (14.) *libellula* 12_{3x4}45 v. nov. (juv.)
 (15.) *libellula* 12₃3(45) v. nov. (juv.)
 (16.) *libellula* (12)345 Moq. (juv.)
 (17.) *libellula* (12)X3(45) v. nov.
 (18.) *libellula* 120_{xx}45 v. nov.
 (19.) *libellula* 1_{2x}3(X4)5₅ v. nov. (juv.)
 (20.) *libellula* 12(34)5 Kregl. (juv.)
 (21.) *libellula* 02345 = *Schracteria* Moq.
 (22.) *libellula* 1030_x(5) v. nov. (juv.)
 (23.) *petiveria* 12₃45 Ckll.
 (24.) *petiveria* 12545 Roebuck.
 (25.) *petiveria* 1₂345 Fenn.
 (26.) *petiveria* 12045 = *Michaudia* Loc.
 (27.) *petiveria* 123445 Borcherding, = var. *sexfasciata* Moq.

This remarkably variable series only emphasises the peculiarities of the previous one. There is very little variation in the ground-color of the shells.

West Cliff, Colo., Sept. 29, 1889.

COLLECTING LAND SHELLS IN SOUTHERN CALIFORNIA.

BY EDWARD W. ROPER.

"Look where you step" is a good rule to follow in any country, but it is absolutely essential in San Diego county, for two reasons. First, because it is very important, if there is a rattlesnake in your

path, to see him before treading upon him. Secondly, because if you carelessly step on the little round cactus so common in this region, the spines, if they do not puncture the sole of your shoe, will penetrate the upper leather more surely than needles. In the eyes of an eastern collector, accustomed to look for land shells in moist, shady places, it is not a promising country. There are no woods, except on the mountains, and few streams of water around whose banks mollusks might be expected. Yet there are shells all around.

Find a cactus that is dead, and turn over its fallen leaves with a stout stick. Like the watermelon, a cactus seems to carry its own water, and under this moist, decaying mass the little *Pupas* may be found, and *Helix Stearnsiana* Gabb takes shelter from the sun. The night dews are heavy, and doubtless when darkness falls, the snails emerge from their hiding places, and browse around for food.

Another favorite collecting ground is a pile of loose rocks; if on the south side of a hill, where the sun beats hottest, so much the better. Turn over every stone until the damp earth is reached, and your eyes will be gladdened by the sight of the elegant dark brown shiny *Glyptostoma Newberryana* W. G. B. If the rocks are in the midst of shrubbery and herbage, the large beautifully banded *Arianta tudiculata* Binn. is likely to be found. Very rarely do any of these shells live on the shaded northern slopes, doubtless because where the ground is less heated during the day, less moisture is condensed at night. In this country, then, the collector truly earns his prizes by the sweat of his brow.

One other land shell is the *Succinea Oregonensis* Lea, of a reddish golden hue, found on the weedy river banks, and living only a little less in the water than its frequent companions *Limnæa Adelinæ* Tryon, and *Physa Gabbii* Tryon. These are the common shells of the open country, although far from numerous in individuals, when one considers the hours of diligent labor necessary to procure a reasonable number.

WHAT IS A SPECIES?

BY CHARLES T. SIMPSON.

In view of the practice of naming *everything* now-a-days by the so-called new school of conchologists, we may well ask the above question. Agassiz in classifying animal life says, that "species are

distinguished by size, proportion, color, habits, and relations to surrounding objects and circumstances." Like many things which we understand very well, the word is difficult to define. It is almost impossible to say just what differences are required to constitute a species or a variety. Perhaps so far as the study of conchology is concerned this definition will answer: *A mollusk which differs from all allied forms by certain distinct constant characters is entitled to specific rank.* As a friend remarked to me: "It is not so necessary that the differences between species be great as that they are constant." Any character or characters of real value that are always present on a shell ought to entitle it to a name; while no matter how marked they may be in individuals, if they imperceptibly fade into those belonging to what have been considered to be other species, they are worthless for purposes of classification. The merest novice who has given any attention to the subject, either collecting or examining cabinets of shells, knows something of how individuals of a species vary. This variation is very often produced by the circumstances by which a mollusk is surrounded,—locality, depth and condition of water, different kinds of soil and bottom, height of elevation on mountain sides, climate and the like. Baron von Tiesenhausen states that *Helix cingulata*, a smooth shell, is found in the valleys of Austria, *H. cingulata* var. *colubrina*, a little mottled and sometimes slightly ribbed, about half way up the mountains, and *H. gobanzi*, which is only perhaps a strongly ribbed form of *cingulata*, lives near their summits. *Fasciolaria tulipa*, when found in quiet muddy bays is a coarse shell with strongly-marked revolving ridges, of a dirty brownish or ash color and scarcely variegated at all; and is in every way inferior to the much larger, finely developed, smooth and handsomely variegated specimens taken in the open sea. *Natica duplicata*, from the vicinity of New England, is a coarse shell often flushed with brown or brownish-yellow, while specimens from the open water in the Gulf of Mexico are smooth and polished, livid in color, or even almost white. The same shell, though, when found in brackish water on the Florida coast, is more like the New England form, but is never brownish in color that I have seen. *Cyrena floridana* is a most variable shell even when a number are taken from the same bed; so much so that Conrad who just named it, subsequently gave to other very different specimens the appellation of *C. protexta*. In color it ranges from a dark purplish crimson, through purple and pink to white, and individuals may be found of

almost every tint of blue; and in form it may be oval, the posterior end may be truncated as in *Unio elegans*, or it may be so drawn out as to be scarcely distinguishable when small, from *Venus flexuosus*. Were there no connecting links I could make a half dozen good species from the shells in my collection. Some specimens have an epidermis almost as rough as its congener *C. carolinensis*, while in others it is almost totally lacking. In all the species I have cited there are connecting links which show that these variations are merely forms of one and the same thing.

In view of these facts and numberless others which could be given of the extensive variability of species, and measured by such a definition as I have given of the word, how ridiculous is the practice of naming every possible variation and form, now so much in vogue with the new school of conchologists; a practice which, I am sorry to say, is not confined to them alone, nor to the present time. M. Bourguignat, who may be fairly considered a representative of this school, says he knows 162 species of *Helix* of the group *Pomatia*, and that of these he possesses 151. And he classifies them into two grand sections and nineteen series! One feels like using the language of the happy father who, when the nurse presented him with triplets, the results of a single birth, exclaimed in utter astonishment, "Great Scott! did any get away?" Why don't they name and describe every individual shell and be done with it? This would certainly be one way out of the dilemma.

(*To be continued.*)

DESCRIPTION OF A NEW SPECIES OF OCINEBRA.

BY F. C. BAKER.

Ocinebra jenksii Baker.

Shell fusiform, thick, ash-colored, shouldered on the whorls; whorls 7½, two apical smooth, rounded, white; the second is but little larger than the first; the third is provided with a distinct carina about midway of the whorl; the rest are strongly shouldered and angular. There are on each whorl nine to ten longitudinal ribs, crossed by ten very strong, coarse liræ, which cut the surface of the shell into coarse reticulations. The spire is high, pointed, and occupies about half the length of the entire shell. Aperture oblong-ovate, choco-

late-colored, and ending below in a short, open canal. Outer lip thickened, arcuate, and five-dentate within. Inner lip smooth, covering the columella. Canal open, short, and a little deflected to the left. Umbilical region closed by the extending columellar callous.

Alt. 17, diam. 10 mill. Aperture alt. 7 (excluding canal), diam. 4 mill.

This is a distinct little shell and not referable to any species with which I am acquainted. Its nearest ally appears to be *Ocenebra circumtexta* Stearns, from which it is separated by its more pointed elongated spire, and absence of the two brown bands. The ribs in *circumtexta* are not so well developed, and the spiral liræ are not so coarse. There are seventeen spirial liræ upon *circumtexta*, whilst upon *jenksii* there are but ten. The greatest difference, however, is in the embryonic whorls, which in *circumtexta* are distinctly bicarinate, while in *jenksii* they are rounded. It bears some superficial resemblance to *Ocenebra gracillima* Stearns, but is separated from that species by its more angular form. The ribs, too, are more numerous in *gracillima*, and the canal is closed. The embryonic apex in *gracillima* is corrugated whilst that of *jenksii* is smooth. It is separated from *Ocenebra michaeli* Ford, by its much shorter canal, more rotund form, and thickened lip.

I have seen but four specimens of this species, obtained from the Wagner Collection at the Wagner Free Institute of Science, and as they show little or no variation, I am led to believe the characters are quite constant.

I am indebted to the kindness of Mr. C. W. Johnson, assistant curator, Wagner Free Institute of Science, for the privilege of studying and describing the species. The types are now deposited in the Wagner Collection. The habitat is unknown.

I take great pleasure in naming this interesting little species in honor of Prof. J. W. P. Jenks, Curator-in-Charge of the Museum at Brown University, Providence, R. I.

HELIX (STENOTREMA) HIRSUTA SAY, ON THE WEST COAST.

Of this form Mr. W. G. Binney remarks in his "Manual of American Land Shells," page 279, "a postpliocene species now found over the Northern and Interior regions as far as Kansas and Vir-

ginia, and even into Alabama." Mr. Pilsbry in his recent Check-List of N. A. Land Shells credits it to the "Eastern United States."

The collection in the National Museum shows that it has a much wider distribution. Upon examining certain shells collected by Dr. Edward Palmer [Mus. No 37282] on the West Coast, several years ago, I found that he had discovered Say's species on the banks of the Yaqui river near Guaymas, on the easterly side of the Gulf of California. The jump was so great, across the continent or a good part of it, that I somewhat doubted my own eyes, and therefore sent specimens to Tryon and Binney to learn their opinions; both of these gentlemen confirmed my determination. Zonites (*Hyalina*) Binney and Morse credited to "North Eastern U. S.; Canada," by Mr. Pilsbry also makes a great leap to the westward, surpassing that of *S. hirsuta*, having been detected at Vancouver Island B. C. according to Dr. J. G. Cooper in Proc. Cal. Acad. Sciences, Dec. 31, 1887.

R. E. C. STEARNS.

Washington, D. C., Oct. 26, 1889.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

Venericordia borealis Conrad.

Shell rounded, obliquely heart-shaped, thick and strong, inequilateral; beaks prominent; elevated and recurved; surface with twenty ribs radiating from the beaks; three ribs are raised, rounded and broad, with a narrow groove between each rib, crossed by coarse lines of growth and the whole surface covered with a strong rusty brown epidermis; hinge strong; teeth two in each valve; interior white; margin crenulated. Length one inch; height one inch; breadth $\frac{7}{16}$. Inhabits from New Jersey to Labrador; generally in deep water. It is often obtained from the stomachs of fishes. Mr. S. I. Smith found specimens in Gardiner's Bay, Long Island, and one specimen was found at Sandy Hook. I have found a few specimens at Block Island. In Maine it grows to a larger size than those found further south. Woodward quotes it from the Sea of Okhotsk, which if true, shows as wide distribution both in climate and in extent of coast.

Another species, the *Cyclocardia novanglie* Morse, is quoted from Connecticut to the Gulf of St. Lawrence, deep water, but has not been found as yet in Rhode Island.

ORDER ASIPHONIDA.

Mantle margins open; no siphons; pallial impressions without sinus. This Order is sub-divided into three Sub-orders. Homomyaria, Heteromyaria and Monomyaria.

SUB-ORDER. HOMOMYARIA.

Both muscular impressions equally distinct.

(To be continued.)

GENERAL NOTES.

Last January a living specimen of *Glandina bullata* Gould, was received from Green Co., Ala.

After keeping it active for a few days it was put in a box, where it remained dormant until placed in a pan containing damp sod (May 4th); since then it has been out most every day.

My children delight to watch it crawl about and often handle it, letting it crawl over their hands.

Some *Patula perspectiva* Say, were put in the pan; off of them it made several meals, removing them from the shell by suction or by cutting away the upper part of the whorls, except the last one.

A *Helix muralis* Müller, was eaten without injury to the shell. A few days ago a Cut-worm was offered to it but was refused; it was then offered a *Limax campestris* Binney, which was eaten with evident relish, as were two others. They were first taken hold of in the fissure, at the base of the palpiform labial appendages, and the fore part of the foot; the buccal pouch was then protruded and the slug forcibly drawn in. The mouth is round, and I judge it to be about three-sixteenths of an inch in diameter. While in the act of swallowing, the palpiform appendages are drawn back to the sides of the head and have a slight resemblance to ears; enough so, that a boy standing by exclaimed, "see his ears; I did not know it had ears."

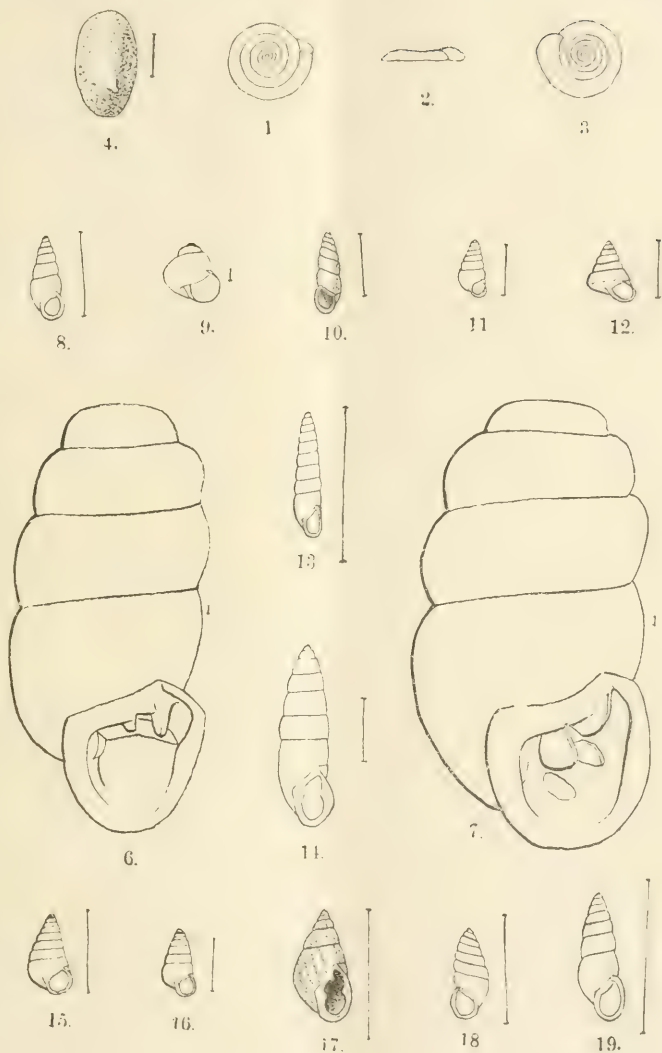
Later I tried it to see how many slugs it would eat at one time. Taking it up by the shell its head would be placed on a slug and in that way it picked up and ate six; the seventh it would not take hold of. This meal gorged it so that it could not withdraw wholly within its shell.—A. A. Hinkley, Du Bois, Ill.

PUBLICATIONS RECEIVED.

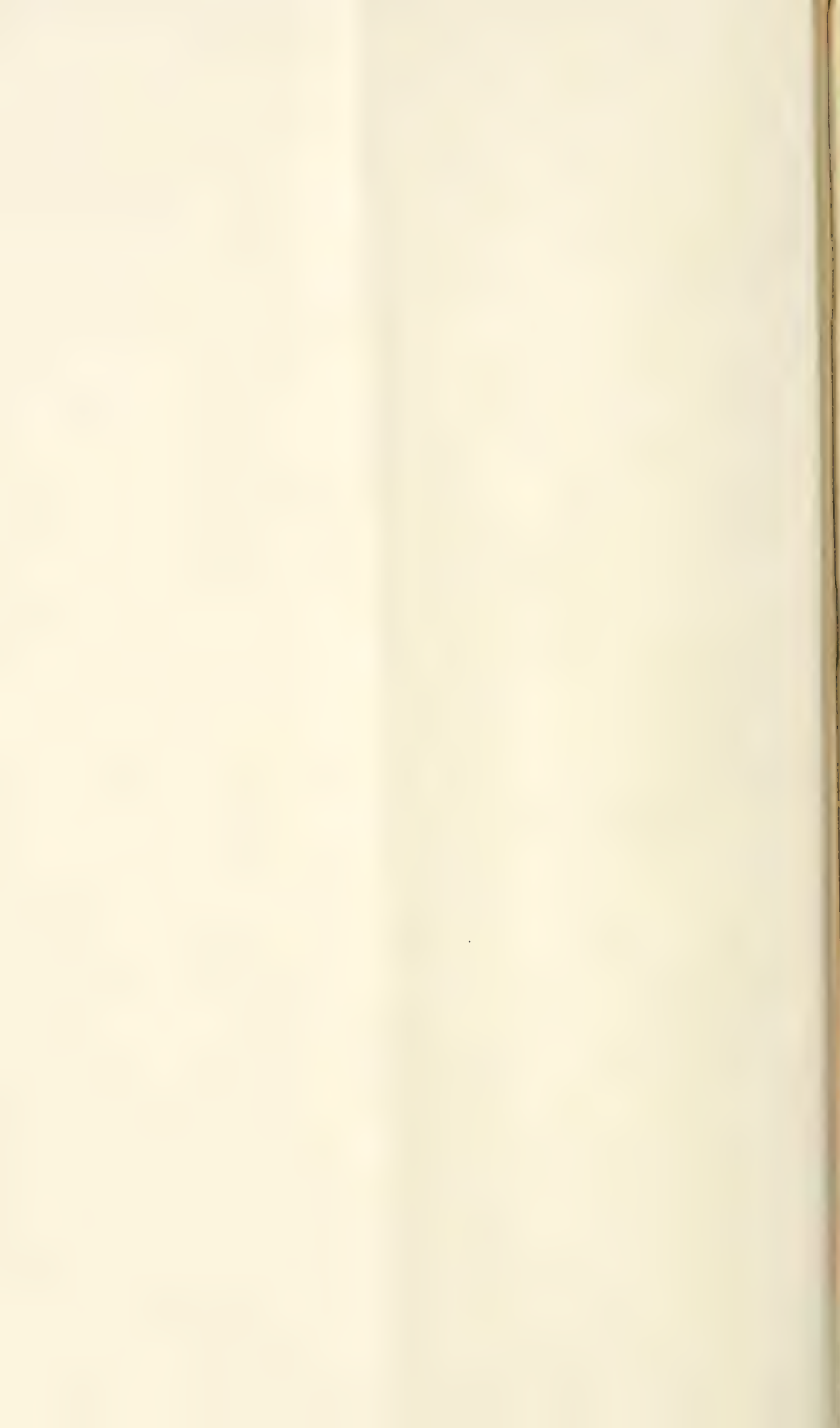
A PRELIMINARY CATALOGUE OF THE SHELL-BEARING MARINE MOLLUSKS and Brachiopods of the Southeastern Coast of the United

States, with illustrations of many of the species, by W. H. Dall, A.M., Honorary Curator Dept. of Mollusks, U. S. Nat. Mus. (Bull. U. S. Nat. Mus. No. 37). "This work is intended to assist students of the Mollusca in the United States, by bringing together for their use a large number of excellent figures of species belonging to or illustrating the fauna of the Southern and Southeastern Coasts of the United States, from Cape Hatteras south to the Straits of Florida and west to Mexico, with the adjacent waters. These figures are explained and connected by a catalogue of the mollusks known to inhabit that region." The extreme northern and extreme southern range of each species is given, and its presence in New Jersey, Virginia, Hatteras, Georgia, East Florida, Florida Keys, West Florida, Texas, West Indies, Bermuda, Europe and West America is indicated in parallel columns. The catalogue thus comprises a dozen local lists rolled into one, and put into the most convenient possible form. We would recommend students working at localities included within the limits above given (Hatteras to West Florida), to use this work as a foundation, and omit in lists for publication the species enumerated by Dr. Dall, unless they are peculiar or local in distribution. As a hand-book for collectors of our southern marine shells, the volume is indispensable. The plates number 74, and illustrate by excellent line-engravings about one-third of the total number of species (1,635) enumerated.

A STUDY OF THE AMERICAN SPECIES OF VERTIGO, by V. Sterki, M. D. (Proc. U. S. Nat. Mus. 1888, 10pp. plate). In this paper Dr. Sterki directs attention principally to the form of the last whorl and the aperture-folds of *Vertigo*, and the relations of American to European species. A convenient formula is given for expressing the combinations, positions and relative importance of the teeth, the principal or primary folds being designated by letters, the smaller secondary ones by dots. Several species included by him in *Vertigo* (e. g., *P. pentodon*) are said to be real *Pupæ*, by high authorities, and possess distinct tentacles. These tiny fellows require further study. The subgenus *Angustula* is proposed for our *V. milium* and the European *V. venetzii*. The group is apparently a natural one, but the name proposed must give way to Moquin-Tandon's *Vertilla*, proposed in 1855 for the last-named species. The figures are excellent, and the whole paper is highly instructive and suggestive, giving evidence of much careful research.



- | | | |
|--------------------------------|---|----------------------------|
| 1, 2, 3, <i>P. cultratus</i> . | 9, <i>P. ceca</i> . | 15, <i>B. pinguis</i> . |
| 4, <i>A. excentricus</i> . | 10, <i>B. compressicollis</i> . | 13, <i>B. proelongus</i> . |
| 6, 7, <i>P. calamitosa</i> . | 11, 16, <i>B. pinguis</i> var. | 14, <i>B. geoffreyi</i> . |
| 8, <i>B. armandi</i> . | 12, " " v. <i>dilitatus</i> . | 17, <i>P. radiata</i> . |
| 18, <i>B. alboreflexus</i> . | 19, <i>B. cantori</i> , v. <i>octonus</i> . | |



THE NAUTILUS.

VOL. III.

DECEMBER, 1889.

No. 8

DESCRIPTION OF A NEW AMERICAN HELIX.

BY F. A. SAMPSON.

On the Boston Mountains, Crawford Co., Arkansas, I found some shells which may be described as follows:

Triodopsis edentata, n. sp.

Shell imperforate, depressed, with granulate striations, thickly covered with hair-like projections; whorls 5, the last strongly contracted at the aperture; suture not much impressed; spire short, obtuse; parietal wall with a long arcuated white tooth; umbilical region impressed; aperture contracted by a deep indentation behind the peristome; on the inner margin of the peristome are two enlargements or obsolete teeth, one near the base, the other midway between it and the right terminus of the peristome.



Greater diameter $13\frac{1}{2}$, lesser 12, height 7 mill.

T. inflecta in Arkansas varies from 9 to 12 mill. diameter, and the larger shells in general appearance are very much like this species with the exception of the teeth on the peristome. Had I found but one or two specimens I would have taken them to be immature *inflecta* of large size, but I found a dozen living and dead shells the latter part of February, and they were all destitute of peristome teeth, and are as much entitled to specific distinction as *Triodopsis Rugeli* Schutt, in which the difference from *inflecta* is the distance of the upper tooth of the peristome within the aperture.

In this species the enlargements of the peristome correspond in position with the teeth of *inflecta*, but it is hardly proper to call

them teeth, the thinner shells being as clear of teeth as a typical *Mesodon*, and only the old thickened shells have the obsolete teeth. They attain a size somewhat larger than the largest specimens of *inflecta* in the Binney collection.

Prof. Call believes them to be *Triodopsis appressa minor*, but they seem to me to be nearer *inflecta* than *appressa*, and if not a distinct species, they certainly are a well-marked variety.

NOTES ON THE VARIATION OF CERTAIN MOLLUSCA
INTRODUCED FROM EUROPE.

BY T. D. A. COCKERELL.

As I have urged when writing of *Helix nemoralis*, few subjects can be more interesting to the conchologist than the effect of environment on species, which is seen so frequently in the case of variable species introduced into new countries.

Through the kindness of Mr. W. G. Binney and Prof. J. H. Morrison, I have been enabled to examine specimens of several species of European Mollusca introduced into this country, and to refer them to various varieties already known in Europe, but mostly so far not recognized in the American fauna.

(1.) *Agriolimax agrestis* (L.) var. *Sylvaticus*. (Moq., non Drap.)

This is the mottled form of the species, and appears to be the prevalent form at Burlington, New Jersey, whence Mr. Binney has sent me several living examples. One of these is unusually large, being 53 mill. long.

(2.) *A. agrestis* var. *typica*. (Less. & Poll.)

This is the spotless type, of which I found a single example at St. Thomas, Ontario, Canada, in 1887.

(3.) *A. agrestis* var. *reticulatus* (Moq.)

Resembles var. *sylvaticus*, but is reddish-ochre with black irregular spots, often tending to reticulation on the body. Sent from Burlington, N. J. (Mr. Binney).

(4.) *Limax* (*Lehmannia*) *variegatus* Drp. var. *flavus* Moq. (= *L. flavus* "L.,"
Auctt.)

Lexington, Va., one example from Prof. Morrison.

- (5.) *Limax maximus* "L.," Auctt., var. *vulgaris* Moq.

This has the dorsal black bands continuous. One from Lexington, Va. (Prof. Morrison).

- (6.) *L. maximus* var. *cellarius* D'Argenville.

The bands on the back interrupted at intervals. Fifteen specimens, some tending toward var. *ferussaci* Moq., from Lexington, Va. (Prof. Morrison).

- (7.) *L. maximus* var. *maculatus* Picard.

The back with black spots irregularly placed. One very nice one from Burlington, N. J. (Mr. Binney).

- (8.) *Helix nemoralis* L.

Mr. Binney has sent me several living examples from Burlington, N. J., among which the var. *rubella* greatly preponderates, *guettardia* and *cuvieria* being the only other varieties represented. It is here interesting to notice, that at Burlington, where the species has been long established, it varies *much less* than at Lexington. The red forms so rare at Lexington, largely preponderate in the Burlington sendings.

Prof. Morrison has lately sent me several more varieties from Lexington, ten being new, and two already recorded in Europe. These latter are var. *requienia* Moq. (= *petiveria* 10345) and var. *libellula* 1(234)5 Kreglinger. The new ones will be recorded later.

- (9.) *Helix hispida* var. *concinna* (Jeffreys).

Mr. Binney sent me a shell found at Montreal, referable to this form. It is pale horn color, max. diam. $8\frac{3}{4}$, alt. $4\frac{3}{4}$ mill. *H. concinna* was considered by Dr. Gwyn Jeffreys a valid species, but it cannot be separated on sufficient grounds from *H. hispida* L.

- (10.) *Helix cantiana* Mont. var. *minor* Moq.

Mr. Binney has sent me an example which he received from Mr. F. R. Latchford, labelled "Citadel, Quebec, Aug. 12, 1886." It is smaller and thinner than the type, with the least tinge of red outside the outer lip. Max. diam. 15, alt. 10 mill. Figured in Bull. Mus. Comp. Zool. Vol. xiii, No. 2 (1886). Pl. I, fig. 13. This form, which I believe is very constant in its characters, is a variety of *Helix galloprovincialis* Dupuy, which, however, is itself undoubtedly a variety of *H. cantiana*.

West Cliff, Custer Co., Colo., Nov. 6, 1889.

WHAT IS SPECIES?

BY CHARLES T. SIMPSON.

But while we are throwing stones at the 'new school' across the water, let us be sure that on this side we are not living in glass houses. Look at the 1200 species of Unionidæ; more than half of which we proudly claim to be residents of the waters of the United States! Look, too, at the vast number of names we apply to our Strepomatidæ, our Planorbis, Linnaeus and Physas! There can be no doubt that the numbers of these genera, and perhaps those of our Zonites and Helices will be greatly cut down when the truth concerning them is at last revealed to us. How many species of shells have we, right here in our own country, which have been thoroughly and carefully studied; of which complete collections have been made of specimens of various ages throughout their range, and compared with anything like complete collections of allied forms? Very few indeed! I know that in the matter of naming we are all "prone to err as the sparks are to fly upwards." It is said that a naturalist has a horror of the unnamed, and I believe it. I know collectors, and good students too, who will not have unidentified specimens in their cabinets, and I confess that it makes me a little fidgety to have a shell that I cannot refer to anything. Those who collect get such things often, and when they refuse to agree with any figure or description, it is aggravating and then often no doubt the Father of Temptation puts it into their heads that they are new; and the thought of seeing their names in print attached to one of the works of nature, and the cheap glory that accompanies it stimulates them to name and send them out, when perhaps had their relations been carefully studied out, they would be found to be merely forms of something already well known. I cannot forbear in this place from quoting from a letter written by my friend, the late Miss Annie E. Law, one of the most careful and indefatigable students and collectors that has ever lived in this country. She says: "I want to tell you what an iconoclast I would be if I had a chance! I send you *Eurycaelon Wheatleyi* which came from Mr. Wheatley himself. Now can you see any reason why *Anculosa praerosa* wouldn't be just as good a name? In the Holston and Clinch Rivers individuals of the same species seem to grow heavier, coarser, and generally larger as we go down stream.

In the upper reaches we have *Io fluviatilis*, 100 miles lower down we have *I. spinosa*, *I. turrita*, and *I. brevis*. I have collected many thousands of these *Io*'s: *spinosa* is the most abundant form; then, after picking out a few *turrita* and *brevis* there are always a large proportion that might fit one place as well as another; therefore I would call them all *spinosa*, more or less developed by local causes. *Pleurocera sycamorens* in one stream becomes *P. estabrookii* in another, and *P. uniale* in a third. *Goniobasis sulcosa* in a brook, becomes *G. arachnoidea* in a creek. *Pleurocera parvum* and *P. Lyoni* in a creek in the mountains, become *P. fastigiatum* in large streams. Dr. Lewis regarded *Goniobasis livescens* and *G. niagarensis* the same, and I don't see why *Pleurocera curtum* and *P. conicum* should need different names; and when it comes to the *Strephobasis* I don't want to name them." Such is the opinion of one who has spent many years of her life in exhaustive research and study among the Molluscs of Tennessee. And when a like thorough search and comparison of all the species of North America has been made I predict that there will be a wholesale addition to the list of our synonyms. No doubt in a number of the cases which Miss Law cites the difference between selected specimens was great enough to warrant separating them and giving them names, but the trouble was that intermediate forms of every degree were found, which completely connected them; and as in so many other cases this variation was produced by circumstances.

Now species founded on trivial characters, or those which insensibly merge into others cannot stand. I fully agree with my friend Dr. Singley of Giddings, Texas, who says that he wants species which he "can separate from others without the aid of a powerful magnifier and a vivid imagination."

A careful and earnest student from Kansas writes as follows: "I have lately collected a large number of *Planorbis trivolvis* from the rivers and creeks in this vicinity, and I find it a most interesting shell. I can take Binney's Land and Fresh-water shells of North America and a box of these and duplicate a half dozen species figured and described in it." And I believe the same will be found to be true of our *Succineas* which need a thorough pruning down in the matter of names.

And what is a variety? If species, as they are now recognized among conchologists, hopelessly run together, where shall the varieties appear? What is the difference between a variety and a species, is

a question that I have often been asked ; in fact I have often made the same inquiry myself. When the Judge wanted to know of Sam. Weller whether he spelt his name with a V or a W he replied : "That depends on the taste and fancy of the speller." And I think that in applying specific or varietal names, much depends on the taste and fancy of the one giving them. I think a definition of a variety might be, a shell which evidently belongs to a given species but which presents certain constant minor variations from the type. Sometimes these may be color, or of size, form, sculpture ; in the presence or absence of a tooth, or other detail, but it should always be constant to be worth anything, and even when it is, conchologists do not adhere to any strict rule in naming. Among the cones and olivas, coloring is often the principal distinguishing character ; while with shells like *Donax* and many of the *Neritas* and *Neritinas*, it counts for nothing.

I believe that those of us who are more conservative should collect and study not with a view to the formation of new species, but to cut down and relegate to the synonymy the hundreds and perhaps thousands of false ones which already exist. Instead of making the inquiry over a puzzling form, isn't it new, it would be better to ask, doesn't it connect species that are now considered separate. Mr. Tryon gloriously inaugurated the work of cutting down the list of our names, and I believe that as great honor and fame awaits the iconoclast in the future, as can possibly belong to the most assiduous member of the new school of the present.

ON CREPIDULA GLAUCA.

BY JOHN FORD.

In his recently published Catalogue of the Marine Mollusks of the Southeastern coast of the United States, Dr. Dall appears to have altogether ignored the existence of *Crepidula glauca*, Say, the figure of the latter, taken from Gould's *Invertebrata* of Massachusetts, having been utilized by him to represent a juvenile *C. fornicata*, Say. The same mistake was made by my friend, the late Mr. Geo. W. Tryon, Jr., in one of his early publications, but a more recent examination of a large number of specimens satisfied him that the species was absolutely distinct from *C. fornicata* or any other species belonging to the genus.

The writer's first knowledge of the characters of the two species certainly convinced him that they were widely separated, and in order that this fact might be made apparent to others, some fine suites of both forms were shown and commented upon at a recent meeting of the Phila. Acad. of Nat. Sciences, and, it may be added, that the conchologists present fully endorsed the views of the speaker.

The several prominent characters exhibited by *C. fornicata* are as follows:

1st, the *lateral* curve of the apex, which, though very prominent, is, as a rule, closely attached to the body of the shell.

2d, the bow-like curve of the free edge of the interior arch.

3d, the well-defined nick at the junction of the latter with the outer wall of the shell. 4th, the *concave* form of the septum, which is the same in all stages of growth.

Other characters might be noted, but those given will doubtless suffice to separate the species, as *C. glauca* has none of the features alluded to.

The apex of the latter species is quite small and comparatively free from contact with the body of the shell. It is also horn-like in appearance, usually shining, and but slightly inclined to curve laterally.

The free edge of the septum is straighter than that of *C. fornicata*, and the notch is not only absent but replaced by a slight advance of that part of the plate along and against the inner wall of the shell. Another, and perhaps the strongest character of the group is the *convex form of the septum*.

This feature, which is a constant one, may be safely depended on to distinguish the species at once from *C. fornicata* *in which the septum is always depressed*. The general outline of the shells will also help the student to divide the species, *C. fornicata* as a rule being pear-shaped, while *C. glauca* is usually disk or quoit-like in form. The prevailing color of the latter is also a distinguishing mark, the inside of the shells being of a dark brown color and the outside a dark gray or purple.

That a species so well marked as *C. glauca* should be dropped or merged into another without a given reason, is no small matter, and more than one student will doubtless thank the eminent Doctor for some explanation.

It may be of interest for some readers of the "Nautilus" to know that a very fine suite of the shells can be seen in the New Jersey

collection of the Philadelphia Acad. of Nat. Sciences ; also, that the writer, who has collected many scores of specimens, has never found them associated with any other species of the genus.

JOHN FORD.

Philadelphia, Pa., Dec. 12th, 1889.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

FAMILY UNIONIDÆ.

This family formerly called *Naides*, embraces those shells commonly called fresh-water clams or mussels. They are found in rivers and ponds all over the world, but they reach their greatest perfection in this country. Over twelve hundred species are known to science, named and properly classified, of which more than half inhabit the U. S. This family has been made the special study of the late Dr. Isaac Lea, of Philadelphia, who died at the advanced age of ninety-five years, on the eighth of Dec., 1886. He devoted fifty years of his life to the study of the *Unionidæ* and has described more new species than all other conchologists together. He has read before scientific and other societies one hundred and fifty-seven papers and has been honored by degrees and honorary membership of twenty-five of the most prominent universities and scientific associations of the world. His great work, "*Observations on the genus Unio*" consists of thirteen quarto volumes, illustrated by hundreds of beautiful plates.

The shells of this family are not in general very attractive on the outside, but the interior of the valves are always lined with a beautiful pearly substance called *nacre*, which in some specimens are pure white and in others salmon, rose-red, blue, green, purple, etc. The sexes in this family are distinct, which is an exception to the rule in a large majority of the species of *Mollusca*, where the sexes are united in each individual. The shells exhibit but little variation in form except the usual one, that the females are more ventricose and broader behind than the males.

The animals of this family are all capable of producing pearls, some of which are of great beauty and value. In one instance sixteen pearls were obtained from a single specimen. One of the

objects of Cæsar's expedition to Great Britain was to obtain pearls from the fresh-water clams of that country. The pearl fisheries of Scotland in the river Tay, were continued until the end of the last century and many large and beautiful pearls were found in the river Tyronne, in Ireland.

One of the finest of the English pearls is now in Queen Victoria's crown. Old and deformed specimens are the most liable to contain pearls, and they consist of a nucleus of some foreign substance such as a grain of sand, covered by successive layers of nacre secreted by the mantle of the animal. The color of the pearls varies with its species, and is of the same shade as the nacre which lines the interior of the valves.

In China the natives make little flat lead casts of their idols; these they insert between the shell and the mantle of the animal, by prying open the valves of these clams with a wedge; the presence of these foreign substances irritates the animal and causes it to deposit layer after layer of nacre upon them. After a time the shells are opened and the images removed and worn as charms.

This family is divided into six genera, three of which inhabit the U. S.: they are called *Unio*, *Margaritana* and *Anodonta*.

Genus *Unio*, Retzius, 1788.

Shell equivalve, multiform; hinge with a short, irregular, striated, simple or divided tooth in each valve, and an elongated, marginal tooth.

There are about one thousand species of this genus, nearly eight hundred of which are American and one hundred and fifty or more inhabit the Ohio river and its tributaries; only five of these are found in New England and but three inhabit R. I.

187.—*Unio complanatus*, Solander.

Syns.:

Mya complanata, Soland. and Dillw.

Union purpurens, Say, Desh. Barnes.

Union purpuraceus, Lam.

Union violaceus, Spengl.

Union fluviatiles, Green.

Union (Naia) complanatus, Perkins.

Shell elongated-oval; beaks at the anterior fourth, almost always eroded; surface coarsely wrinkled by the lines of growth, and

covered with a thick tar-colored or very dark green epidermis; interior lined with a dark peach blossom nacre, sometimes salmon colored. There is a single, erect, pyramidal, coarsely striated cardinal tooth in the right valve, and two triangular, pyramidal teeth in the left valve; lateral teeth long, compressed and slightly curved. Length, $3\frac{1}{2}$ inches; height, 2 inches; breadth, 1 inch.

This is our most common fresh-water clam. It is found in all the rivers in the U. S. which empty into the Atlantic Ocean, but is not found west of the Atlantic slope. It is also abundant in almost all the ponds east of the Allegheny mountains. It might be collected by bushels in the Blackstone River, Cunliff's Pond, Old Warwick Pond and many others. It is a favorite article of food for the muskrat, which devours them in great numbers, leaving piles of empty shells on the edges of the streams and ponds. It is a very curious thing how the muskrat can open the shell and devour the animal without leaving a mark of teeth or claw upon the shell. Specimens freshly cleaned of their contents are in as fine condition for the cabinet as those obtained alive and prepared on purpose, the two valves held together perfectly by the ligaments, and the edges or margins of the shell unbroken.

188.—*Unio nasutus*, Say.

Syns.:

Mya nasuta, Wood.

Eurynea nasuta, Stimp, Perkins, Morse, etc.

Unio rostratus, Valenc.

Unio nasutus, Say, Con. Lea, Gld. Dall, etc.

Shell slender, very inequilateral; beaks small, pointed and slightly elevated, posterior produced so as to form a snout, from which peculiarity its specific name. There are usually two or three radiating lines running from the beaks to the end of the snout. Surface smooth; epidermis glossy, of a dark olive-green color, becoming dusky in old specimens. Nacre silvery white, iridescent, sometimes with shades of bluish or salmon; cardinal teeth delicate, compressed and directed obliquely forwards; cavity of the beaks small. Length, 3 inches; height, $1\frac{1}{4}$ inches; breadth, $\frac{4}{5}$ inch.

Described by Thos. Say in Nich. Ency. 1816. It is quite a common shell in the Middle and some of the Western States, but is very rare in New Eng. It has been found in only four localities in Mass.

and in one in Conn., and after searching in vain for several years and having given up all hopes of finding it in R. I., I unexpectedly discovered a locality in the summer of 1871. In hunting for other species of shells in Cunliff's Pond at Elmville, in Cranston, I saw a few single valves of this species lying near the shore; knowing that if dead shells were on the bank, live ones must be in the pond, I went in, and succeeded in finding several splendid specimens of this rare and unique species.

GENERAL NOTES.

NEW AMERICAN SHELLS. The following species are described in a paper read before the Philadelphia Academy. *Pupa Sterkiana*, a cylindrical species, the shape of *P. muscorum*, but nearly as large as *armifera*, the mouth without teeth, surface strongly rib-striate, from Lower California. *Zonites selenitoides*, a Californian species, a little larger than *Z. minusculus*, ribbed like *Selenites durantii*. *Helix Streatori*, from Caymon Id., south of Cuba, allied to *H. gaussoini* Tryon, but more depressed, banded with chestnut color, and with more conical spire.—*Pilsbry*.

PÆCILOZONITES CIRCUMFIRMATUS VAR. CORNEUS. This is different from the typical form in lacking color-markings. Shell thin, fragile, horn-colored. The specimens were given me by the ABBE VATHELET, who collected them in Bermuda.—*Pilsbry*.

PUPA WANTED. The editor wishes to obtain specimens of *Pupa decora* Gld. for comparison with Western shells. A liberal exchange will be given.—*Pilsbry*.

LIMAX AGRESTIS IN PHILADELPHIA. I have just examined a series of 21 examples of this species collected in Philadelphia, Pa., and kindly sent to me by Mr. H. A. Pilsbry. So far as one can judge from alcoholic specimens, five color-varieties are represented. Two specimens appear white, and may be referred to var. *albidus*, Picard. Six are pale ochery, and spotless, and are referable to *typicus* Less. and Poll., but approach *rufescens* in their color. Six have very indistinct brownish marbling or reticulation, and may be classed under Moquin's var. *obscurus*. Five are var. *sylvaticus* Moq. (now Drap.), and two are to be regarded as *V. reticulatus*, although differing slightly from the description of that variety. One specimen

has the mantle distinctly bifid anteriorly,—a very interesting malformation which I have not before seen.

T. D. A. COCKERELL.

West Cliff, Colorado, Dec. 7, 1889.

HYALINIA STERKII Dall, originally found near New Philadelphia (Tuscarawas Co.), Ohio, has also been collected in the Northeast (either Summit or Lake Co.) of the same state.—*Dr. Sterki.*

FOR THE EXAMINATION of small and minute species of *Hyalinia*, *Pupa*, *Vertigo*, etc., it is just the right thing to have everything collected in a locality mixed up; that will allow the best idea of the malacological character of a place.—*Dr. Sterki.*

PUPA HOLZINGERI, Sterki, proves to be widely distributed in the Northwest. Since the first few examples were known it has been collected in Will and LaSalle Counties, Illinois, by Mr. J. H. Ferriss, of Joliet, Ill. From Iowa, Nebraska and Dakota (Ft. Berthold), I found it in collections, under various names. From Minnesota I know of none after the first examples from Winona.—*Dr. Sterki.*

DR. DALL has recently proposed a new classification of the Bivalves, very different in some respects from the old arrangements founded on the number of muscles or gills. An abstract will appear in the January NAUTILUS.

AN INTERESTING little book has been received from Prof. R. E. C. Stearns, on "Ethno-Conchology; a study of Primitive money" (*Ex Rep. U. S. Nat. Mus.*). Romance and love, pearls, treasures, dashing Spanish cavaliers, and all manner of attractive things illuminate the earlier pages; from these the author descends to the more sordid and commonplace money-cowries, and to strings of purple and white wampum, Dentalium-money and Haliotis-money. It is all so interesting that we will not quote, but recommend the entire paper to our readers.

THE NAUTILUS.

VOL. III.

JANUARY, 1890.

No. 9.

IN A MAINE CONCHOLOGIST'S HUNTING GROUNDS.

Next to the pleasure of being in a region which has not been scientifically explored, the student of natural history finds most delight in visiting a place where some shining luminary in his favorite branch has made his mark. There is the earnest resolve to find every species mentioned by the earlier scholar, and the tempting hope of something new. Such a spot is the beautiful town of Bethel, Me., the old stamping ground of Edward S. Morse. Those who have read his papers on the land and fresh water shells of Maine, on the land Mollusks of New England, and his more general articles on the Pupae and Vertigos, can but regret that the greater attractions of Japanese pottery and the lecture platform, drew him away from studies of conchology. For he is a man who goes deep into whatever subject he takes up, even the humble land snails no larger than radish seeds. It was at Bethel that Morse discovered the curious little *Planogyra asteriscus*, the lusterless steel-blue *Zonites ferreus*, and the tiny *Vertigo ventricosa*. I found the former abundant in a swampy place beneath some pine trees on the edge of the wide *Androscoggin* intervals, early in October. The layers of damp leaves were alive with many species of minute shells, *Zonites milium* and *Z. Binneyanus*, both Morse discoveries, were very rare, but *Z. exiguus*, *Z. radiatulus*, *Z. fulvus*, *Patula lineata*, *Vertigo Gouldii*, *Pupa contracta* and *Carychium exiguum* were plentiful. By taking up each dead leaf separately, a few brown specks were sometimes found, which a magnifying glass revealed as *Punctum pygmaeum* or *minutissimum*. In dryer places, beneath pieces of bark, and fallen trees were other tiny shells. *Zonites ferreus*, *Patula striatella*

a single *Patula harpa*, *Helix labyrinthica* and *Zonites arboreus*. An old oak stump in the pasture was the hiding place of *Helix monodon*. Beneath fern roots in a clump of oak trees in the interval I discovered *Macrocyclus concava*, *Succinea obliqua* and *Vitrina limpida*, perhaps the most slimy and difficult to handle of all shells, after being plunged into hot water previous to cleaning. Lastly, where the brook moistened the mossy rocks and the roots of the great beach trees, was the home of the plainly beautiful *Helix albolabris*. Only in one spot did I find the *asteriscus*. Perhaps Morse found his type specimens in that identical spot. Whether he did or not is immaterial, but he could hardly have found a better place, or experienced more pleasure in the discovery than I did.

It was Edward S. Morse who remarked that the multitude of intelligent young people who spend hours in the puzzle departments of magazines, and obtain simply an answer to clever word juggling, could find equally entertaining puzzles in Nature's book, the solving of which would bring more than mere words. They would find that the life history of natural objects had all the fascination of a well-written story—the turning of every page, arousing increased interest in what might follow.

Our young students of conchology should be induced to look among the little shells for new discoveries. Anybody can pick up *Helix albolabris* in its home, but only those who know what they are looking for can find *Planogyra asteriscus*. Let us see if the influence of Morse and his Bethel shells can be made to animate a new generation of pupils.

EDWARD W. ROPER.

NOTE ON *CREPIDULA GLAUCA* SAY.

BY W. H. DALL.

My friend, Mr. John Ford, raises the question of the omission of this alleged species from the list of Mollusks of our southeastern coast and asks for an explanation. In reply, I would say that the specimens named *C. glauca* by Stimpson and others among the older

naturalists, which have come under my notice have all appeared to me to be referable to *C. fornicata* (L.) Lam., or to the variety of *C. convexa* Say which has grown upon a broad, not very convex, or perhaps a partly concave surface. A fine series of shells from Cape May, submitted to me by Mr. Ford as *C. glauca* come under the latter category. They are distinct from *C. fornicata*, but they do not show the characters called for by Say's description, which in itself presents no features to distinguish the shell he describes from the young and spotted form of *C. fornicata*, to which I have no doubt it belonged. Such shells are in the National Museum labeled *C. glauca* by Stimpson. It may not be known to all our conchologists that the extremely high and usually dark-colored forms of *Crepidula*, such as *C. convexa* (typical) and *C. adunca* of California, derive their peculiar appearance from roosting on some gasteropod, and that wider and less elevated forms of the same species can almost always be found, if not in the same locality, at least in a geographical series of wide range. The difficulties, in the way of a satisfactory determination of such semi-parasitic forms as the *Culyp-træidæ* are very great, and increase in my experience with the amount of material subjected to study. That there may be a distinct form entitled to be called *C. glauca* I do not wish positively to deny, but I must confess that I have never seen one and therefore have grave doubts of its existence.

A LIST OF THE MOLLUSCA OF COLORADO.

(Compiled for the Colorado Biological Association.)

BY T. D. A. COCKERELL.

In the "Journal of Conchology," vol. vi, pp. 60-65, I gave some preliminary remarks on the Mollusca of Colorado, stating that from the lack of records and other reasons, a complete list could not then be prepared. Since then a considerable amount of material and information has been gathered, and while much remains unknown, there is sufficient ascertained to seem to warrant the presentation of a faunal list. In this list the localities are not all given in detail, as

it has been deemed unnecessary to repeat details of this kind which have been published elsewhere. Many species are considered by the author to be identical with those of Europe; some of these are considered distinct by good authorities, and pending sufficient anatomical comparisons, are retained as varieties. A distinction is also drawn between "forms" and "varieties."

LIMACIDÆ.

Agriolimax campestris var. *montanus* (Ing.), Grand Co. (Ingersoll), *Agriolimax* Mörch presents differences from *Limax* proper which are probably to be considered generic. *A. montanus* cannot be distinguished from *campestris* by external characters, and I do not think its anatomical ones warrant specific separation.

A. campestris montanus form *castaneus* (Ing.) Blue River Valley (Ingersoll). Probably only a young example of *montanus*, and certainly no better than a variety. Vide J. of Conch. V, 358.

A. campestris montanus form *typicus* Ckll. Custer Co.; Chaffee Co.; Saguache Co.; Fremont Co. (Canon City); Summit Co.; Eagle Co.; Mesa Co.; Gunnison Co.

A. campestris montanus form *intermedius* Ckll. Saguache Co.; Fremont Co. (Canon City); Pueblo Co. (Wales Canon); Custer Co. (Wet Mountain Valley); Summit Co.; Mesa Co.; Delta Co.

A. campestris montanus form *tristis* Ckll. Lake Co.; Summit Co.; Delta Co. A few specimens of *A. agrestis* and *Helix nemoralis*, from Burlington, New Jersey, have been liberated at West Cliff, Custer Co.

Vitrina pellucida var. *limpida* (Gould). White Earth River (Ingersoll); Dillon, Summit Co.; Swift Creek, Custer Co.; Grand Mesa, Mesa Co.; Wales Canon, Pueblo Co.; Cottonwood Gulch, Saguache Co.; near Mam Mts., Mesa Co.; West Fork of Surface Creek, Delta Co.; South Park (Yarrow).

V. Pfeifferi Newc. Head of Gunnison River (Binney); San Juan Co. (Ingersoll); E. Fork Arkansas River, Lake Co.; near Cattle Creek, Garfield Co.; near Mam Mts., Mesa Co.; Breckenridge (Hy. Prime); Rock Creek, Routt Co.; Fort Garland (Yarrow); Twin Lakes (Yarrow).

Hyalina nitida (Müll.) High alpine (Carpenter), needs confirmation.

Hyalina arborea (Say). San Juan Co. (Ingersoll); Williams Canon, Manitou (M. E. Cusack); South Park (Yarrow); Twin

Lakes (Yarrow); near West Cliff, Custer Co.; Micawber Mine, 10,000 feet, Custer County; Wales Canon, Pueblo County; Slate Creek, Summit Co.; Buzzard Creek, Mesa Co.; Black Lake Creek, Summit Co.; Chalk Creek, Chaffee Co.; Divide Creek, Garfield Co.; Plateau Creek, Mesa Co.; Kremmling, Grand Co.; near Egeria, Routt Co.

H. arborea form *viridula* Ckll. (Science Gossip, 1889, 257.) Horseshoe Bend Gulch, 10,000 ft., Custer Co., and other localities in the same district.

H. radiatula (Alder). Saguache Co. (Ingersoll); South Park (Yarrow). This is *electrina* Gld., but it may not be *viridula* Menke.

H. radiatula form *radiatula* (Alder). Pueblo Co.; Smith's Park, Custer Co.; Mesa Co.; near Cattle Creek, Garfield Co.

H. radiatula form *viridescens-alba* (Jeffreys). Smith's Park, Custer Co.; Mesa Co.

H. minuscula (Binney). Mountains near Ft. Garland (Yarrow).

H. (Conulus) fulva var. *chersina* (Say). White Earth River (Ingersoll); South Park (Yarrow); Twin Lakes (Yarrow); near West Cliff, Custer Co.; Micawber Mine, 10,000 ft., Custer Co.; Pueblo Co.; Kremmling, Grand Co.; near Egeria, Routt Co.; Buzzard Creek, Mesa Co.; Surface Creek, Delta Co.; Divide Creek, Garfield Co.; Black Lake Creek, Summit Co. *H. chersina* seems to me a pure synonym of *fulva*, but Mr. Ancey regards it as probably distinct.

HELICIDÆ.

Patula strigosa (Gould). Grand R. (Binney); Gilpin Gulch (H. Prime); Blue River (Yarrow); Saguache (Yarrow).

Patula strigosa form *globosula* nov. Small, globose, dark above periphery with two bands, transverse grooved striæ rather well marked. Diam. $11\frac{1}{2}$, alt. $8\frac{1}{2}$ mill. Black Lake Creek, Summit Co. The specimen seems immature, but is remarkable as being the only form I have seen in Colorado that is nearer to *strigosa* than *Cooperi*. Is doubtless allied to var. *Gouldi* Hemphill.

P. strigosa var. *Cooperi* W. G. Binney. Grand River (Binney); Blue River Valley (Ingersoll); Gilpin Gulch (H. Prime); Williams Canon, Manitou (M. E. Cusack); Morrison, Lyons, and St. Vrain Canon (A. Eastwood); Gunnison (E. W. Roper); Middle Park and North Park (Ingersoll); near Durango (A. Eastwood); Micawber Mine, Custer Co.; Kremmling, Grand Co.; Egeria,

Routt Co.; Pueblo Co. (R. Cusack); Hardserabble Canon, Custer Co.; Black Lake Creek, Summit Co.; Pottery Pass, about 11,500 feet, Summit Co.; Red Cliff, Eagle Co.; near Glenwood Springs, Garfield Co.; near Buzzard Creek, Mesa Co.; Surface Creek, Delta Co.; near White Earth Creek, Gunnison Co.

P. strigosa cooperi form *typica* Ckll. Canon City (T. Morgan); Cave of the Winds, Manitou (E. W. Roper), and many other localities.

P. strigosa cooperi form *trifasciata* Ckll. Mesa Co.

P. strigosa cooperi form *confluens* Ckll. West Mountain Valley, Custer Co.; Garfield Co.; Mesa Co.

P. strigosa cooperi form *elevata* Ckll. Delta Co.

P. strigosa cooperi var. *depressa* nov. Shell flattish, max. diam. $21\frac{1}{2}$, alt. $12\frac{1}{2}$ mill. Specimens of this variety were sent to me by Miss A. Eastwood, who found them in a canon near Durango. The same variety is figured by Binney, Man. Amer. Land Shells (1885), p. 166, fig. 153.

P. strigosa cooperi form *major* nov. Shell with diam. 25 mill. Near head of North Mam Creek, Mesa Co., Sept. 14, 1887.

P. strigosa cooperi var. *minor* Ckll. Near Egeria, Routt Co., abundant. It is quite a distinct local race.

P. strigosa var. *hemphilli* (Newc.) Williams Canon, Manitou (Binney). This perhaps requires confirmation. The examples of *strigosa* I have seen from Williams Canon are ordinary *cooperi*. The young of *cooperi* is keeled.

P. striatella (Anth.) Twin Lakes and South Park (Yarrow); Este's Park (Binney); Grand Co. (Ingersoll); Gilpin Gulch (H. Prime); Williams Canon, Manitou (M. E. Cusack); Swift Creek, Custer Co.; Kremmling, Grand Co.; Rock Creek, Routt Co.; Powderhorn, Gunnison Co.; Divide Creek and near Cattle Creek, Garfield Co.; Buzzard Creek, Mesa Co.; Black Lake Creek, Summit Co.

P. striatella form *albina* (Morse). Near Mam Mts., Mesa Co. Differs from the type in having a white shell.

P. ruderata var. *cronkhitei* (Newc.) Blue River Valley (Ingersoll); Cottonwood Gulch, Saguache Co.; Micawber Mine, Chester Co.

P. ruderata cronkhitei form *viridula* nov. Shell greenish-white. Micawber Mine, Custer Co.

P. ruderata var. *gorktschana* Mouss. Ouray Co. (Binney).

P. (Punctum) pygmaea var. *minutissima* (Lea). Willow Creek,

Custer Co. I doubt whether *minutissima* is separable even as a variety from *pygmæa*.

P. (Punctum) conspecta (Bland.) San Juan Co. (Ingersoll).

P. (Thysanophora) ingersolli (Bland). San Juan Co. (Ingersoll); near Brush Creek, 10,000 ft., Custer Co.; Clearwater Creek, Grand Mesa, Mesa Co. A species of high altitudes.

P. (Helicodiscus) lineata (Say). Animas Valley (Ingersoll).

Helix (Stenotrema) monodon Rack. Colorado Springs (Yarrow). Beyond this record, nothing is known of any species of the group in Colorado. Probably the Colorado Springs *H. monodon* was introduced by human agency.

H. (Vallonia) pulchella var. *costata* (Müll.) San Juan Co. (Ingersoll); South Park (Yarrow); Micawber Mine, Custer Co.; Rock Creek, Routt Co.; Kremmling, Grand Co.; Pueblo Co.; near Salida, Chaffee Co.; Black Lake Creek, Summit Co.; Buzzard Creek, Mesa Co.; near Cattle Creek, Garfield Co. Perhaps *costata* deserves to rank as a species distinct from *pulchella*.

H. pulchella costata form *cyclophorella* (Ancey). The ribs in this form are close and delicate, but it seems to me referable to *costata*. Mr. Ancey has identified a specimen from West Mountain Valley as *cyclophorella*, and indeed, if the name is to be adopted, it will probably include at least a majority if not all of the Colorado specimens of *Vallonia*. Vide 11th Rept. Colo. Biol. Assn. (1889).

H. pulchella pulchella Müll. Binney records *pulchella* from Este's Park, but it is probable that the form was *costata*.

West Cliff, Custer Co., Colorado, Dec. 10, 1889.

AN ANNOTATED LIST OF THE SHELLS OF ST. AUGUSTINE, FLA.

BY C. W. JOHNSON.

The following is a list of the shells which came under my observation while living at St. Augustine from 1881-88.

As very little dredging was done it is probably far from complete, but as some of the notes may be of interest to the Conchologist, I herewith submit it to the readers of the Nautilus.

Octopus rugosus Bosc. A few which are evidently this species, one large specimen is preserved in alcohol.

Argonauta argo L. Occasionally a shell is found after a storm.

Loligo pealii Lesueur. Quite common.

Ommastrephes bartramii Lesueur. One specimen, probably this species, is preserved in alcohol in a private collection.

Spirula peronii Lam. The internal spiral shells are common among the debris after storms.

Murex spinicostata Valenc. Living examples are rare. I have seen but three. By the numbers found in the shell mounds and fields it seems to have formally been quite plentiful and a special object of capture among the aborigines.

Urosalpinx cinereus Say. Common on oysters.

Eupleura caudata Say. A few specimens.

Purpura hæmastoma L. var. *floridana* Cour. Common on the old light-house rocks. It varies greatly in form. I have specimens varying from those without a shoulder or tubercles on the body-whorl, to those that are shouldered and bearing two prominent rows of tubercles.

Purpura hæmastoma L. var. *undata* Lam. A few specimens found with the above.

Fasciolaria distans Lam. I think that this is distinct from *F. tulipa* L. The specimens collected here show no intermediate form. It seems to have a more limited distribution. I do not remember seeing any in the southern part of Florida, and among the quantities of shells brought from the Bahamas I never observed one, though *F. tulipa* L. is quite common. A color variety is occasionally found here in which the maculations and revolving lines are reddish-yellow to pink.

Fasciolaria tulipa Linn. Not common.

Fasciolaria gigantea Kien. Several specimens. I found a living specimen in the harbor nearly two feet in length.

Fulgur carica Gmel. Common and quite destructive to the oysters.

Fulgur carica Gmel. var. *eliceans* Mont. Thick and gibbous, with fewer and larger spines, occasionally a double row of spines on the shoulder of the whorls. More plentiful than the typical.

Fulgur perversa Linn. Common and some unusually large specimens.

Fulgur canalienulata Say. Not common, and smaller than those from more northern localities.

Fulgur pyrum Dillw. Not common.

Nassa vibex Say. Common on the sand bars between tides.

Nassa acuta Say. Rare. I doubt whether this is the same as *N. ambigua* Mont. This was the most common gasteropod in a deposit of shell brought up from forty feet below the surface in sinking the well of the Ponce de Leon Hotel.

Nassa obsoleta Say. Common on the mud between tides.

Nassa trivittata Say. A few on the ocean beach usually sea worn.

Marginella apicina Menke. A few sea-worn specimens.

Olivella mutica Say. Common on Bird Island beach.

Olivella mutica Say var. *nitidula* Dillw. More plentiful than the typical.

Oliva litterata Lam. Common. The specimens found here are longer and more cylindrical than those from the Gulf coast.

GENERAL NOTES.

ARION FOLIOLATUS GOULD, REDISCOVERED. You may announce in your Journal, if you wish, that Hemphill has sent one living *Arion foliolatus* Gld., from Olympia, Washington. One big fellow is over four inches long. It agrees perfectly with Gould's description and figures, though not quite so deep a red as the latter. It has the internal plate of *Prolepis*. The caudal mucus "pit" is, very plainly seen. Jaw with over 22 ribs, wide, low, scarcely arcuate.—W. G. BINNEY, *In letter to Ed.*

LIMAX HEWSTONI COOPER IN LOS ANGELES COUNTY. In "Nomenclature and Check-list of North American Land Shells," the *Limax Hewstoni* is not quoted south of San Francisco. I have often found a shellless snail at this place and these have been identified by Dr. J. G. Cooper of California as the *Limax (Amalia) Hewstoni*.—M. BURTON, *Williamson University, Los Angeles County, California.*

KANSAS SHELLS. I have identified the following species of Land Shells from Sedgwick County, Kansas: *Pupa contracta*, *corticaria*, *armifera*, *rupicola*, *fallax*, *Hyalina indentata* and *arborea*; *Helico-*

discus lineatus, *Strobila labyrinthica*, *Vallonia pulchella* var. *costata*, *Limax campestris* and *Bulimulus dealbatus*, also *Pupa fallax* and *rupicola* from Kingman County, 60 miles west of Wichita. Is it in any way remarkable to find so many species of Eastern and South-eastern Shells so far West and North of this?—FRANK J. FORD, *Wichita, Kansas, in letter to Ed.*

CREPIDULA GLAUCA vs. C. CONVEXA. In the discussion of these *Crepidulas* the fact seems to have been lost sight of that if identical (as I have no reason to dispute) the name *glauca* has precedence over *convexa* in the original paper by Say in the Journal of the Academy of Natural Sciences of Philadelphia. The names would stand thus: *C. glauca* Say for the type form, and *C. glauca* var. *convexa* Say, for the high rounded form, if it be considered of even varietal importance.—H. A. P.

SCALARIA of the New Jersey Coast. Under the name of *S. angulata* there have been included two species by most authors and collectors. These have been separated and the differential characters pointed out by Dr. Dall, in his great work on the 'Blake' Mollusks, who proposes for the more slender, elongated one the name *Scala sayana*. This very form is, however, the true *S. humphreysii* of Kiener, described and figured many years ago. The synonymy of the two forms has become so confused that I give it below in systematic order.

Scala angulata Say.

S. clathrus var. *angulata* Say, Amer. Conchol., pl. 27, two upper figures.

S. angulata Say, Sowerby in Thes. Conch., I, p. 86, pl. 32, fig. 5, 1847; and in Conch. Iconica, vol. XIX, fig. 14.

S. angulata Say, Tryon in Amer. Marine Conchol., p. 77, fig. 140 (bad); and in Manual of Conchology, vol. IX, p. 70.

S. angulata Say, Dall in Bull. U. S. Nat. Mus. No. 37, p. 122.

Scala humphreysii Kiener.

S. humphreysii Kiener in Species et Icon. Coquilles Vivantes, *Scalaria*, p. 15, pl. 5, fig. 16.

S. lineata Gould in Invert. of Mass., Binney's edit., fig. 580, but not description.

S. sayana Dall, Report on Blake Gasteropoda, p. 309; and Bull. U. S. Nat. Mus. No. 37, p. 123, pl. 50, fig. 10.

The mistake of considering *S. humphreysii* a synonym originated with Sowerby. By blunder it is quoted "*humphreysiana*" in the Conchologia Iconica, and Tryon evidently followed that work instead of the original in the Manual of Conchology. To Dr. Dall belongs the credit of discriminating the species from *S. angulata*, and I regret the necessity which compels me to place the name he proposed in the synonymy. *S. humphreysii* is more plentiful than the real *S. angulata* on the Southern New Jersey Coast.—H. A. P.

TEETH OF SNAILS. The Editor has recently received from Miss Anna Goodsell, Poughkeepsie, N. Y., a number of beautifully mounted radule of Western Mollusks. If conchologists who possess microscopes of even very moderate powers will examine these beautiful structures they cannot but become interested in them. Odontophores of numerous Western species can be obtained of Miss Goodsell.—P.

PUBLICATIONS RECEIVED.

ON THE LINGUAL DENTITION AND SYSTEMATIC OF PYRGULA by C. E. Beecher. (*Ex. Jour. N. Y. Micros. Soc.*) The dentition of this interesting genus for many years a desideratum is figured and its character discussed by Mr. Beecher. He concludes that *Pyrgula* is most nearly allied to the *Melanians*. The true position of the genus seems to us to be with *Baicalia* and its subgroups, *Micromelania* and a few other small groups, which agree in having no basal denticles to the central teeth. The entire anatomy, the shells, and the radula (apart from this one character of lacking basal denticles) is that of *Amnicola* and other fresh-water rissoids, not at all like *Melania*. Dr. Fischer has already included *Baicalia* in the *Hydrobiidae* as a subfamily, *Baicaliinae*. I would enlarge his subfamily to include not only *Baicalia* and its sections, but also *Pyrgula* and *Micromelania*. The

North and South American so-called *Pyrgula* belong to *Pyrgulopsis* Call and Pilsbry and *Lyrodus* Döring, and group with *Amnicola*.—*P.*

NOTICE TO YOUNG COLLECTORS.

The proprietors wish to state that beginning with the February number, the young readers of THE NAUTILUS will be provided with an

AMATEUR'S CORNER

in which the rudiments of Conchology will be taught, illustrations of well-known shells given, scientific terms explained, and any other information given which will be of interest to young collectors. Prof. Josiah Keep, author of that popular book "West Coast Shells," Dr. V. Sterki and others have promised to contribute articles to this department, and we look forward to a good time in our renewed search for "Shell Knowledge" in company with you.

We would state that together with the Latin terms used we will give the common names of shells when they have any.

H. A. P. & W. D. A.

THE NAUTILUS.

VOL. III.

FEBRUARY, 1890.

No. 10.

COLLECTING LAND SHELLS IN EASTERN NEW YORK.

BY W. S. TEATON.

Near the east shore of the Hudson, midway between Tivoli and Barrytown, in Dutchess Co., New York, is Cruger's Island. It has an area of seventy-five acres, and is so richly endowed with beauties and attractions—nature's gifts, which the owners have carefully fostered—that to the visitor it seems a place of enchantment. The scenery is especially fine; an almost undisturbed view for miles up and down the "Rhine of America," with the majestic Catskills some ten miles distant to the west, a beautiful background to the picture; while from its many winding paths are ever-changing vistas of water, mountain and sky.

At the northeast a large stream, the White Clay Kill, rushes down the rocks through a romantic glen and has its outlet. South of this, for a long distance, fringing the east shore of the cove, and having a width varying from an eighth to a half mile, is an extent of heavily-wooded land of perhaps two hundred acres, part of a park-like domain of Revolutionary days called "Almont." The soil is of decided clayey character, and there are a half dozen little rivulets coming from the hills at the east running through to the river. With their numerous tributary branches they have cut their way down through the plastic earth making quite an intricate succession of deep gullies.

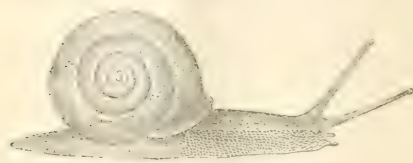
Here are hundreds of grand, massive white oaks, beeches, and hickories, growing so thickly as to almost shut out a glimpse of the

sky. It is a scene of primitive sylvan grandeur not often found in this part of the country. Great numbers of fallen trees and decaying logs are lying in every ravine, and the ground is thickly carpeted with leaves. It is thus an ideal home for the land snails, which flourish in abundance, and a "happy hunting ground"



Helix albolabris.

for the enthusiastic collector, who, if he pays it a visit during a warm, humid day of summer—just after a shower for instance, when everything among the trees is saturated, and the air is smoking with moisture—will find the woods literally teeming with Molluscan life.



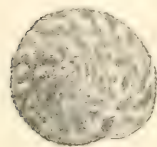
H. palliata.

become quite a slimy mass, not conducing in any great degree to personal comfort, but who among the Nautilus people could resist a like temptation?



H. palliata.

At such a time an abundance of *Helix albolabris*, large and beautiful, and *H. thyroides*, crawling about the logs, and traveling among the leaves; plentiful supplies of *H. alternata* and *palliata*, but keeping nearer at home; occasionally a *Zonites fuliginosus*,—a very pretty shell when perfect; many of *H. tridentata*; *H. monodon* (*fraterna*), and *hirsuta* to be had on closer search among the stones in the vicinity of the falls; while down at the river's edge, on the rushes and weeds, are thousands of *Succinea ovalis*, and associated with them though in greatly lessened proportion, is an elongated form of *S. arava* of dark amber color, some individuals of which are found reaching 11 millimeters in length.



Patula alternata.



(To be continued.)

NEW WESTERN SLUGS.

BY T. D. A. COCKERELL.

Prophysaon pacificum Cockerell, n. sp.

Length (in alcohol) $17\frac{1}{2}$ mill. Body and mantle ochery-brown, head and neck gray. Mantle granulated, rather broad, with a black band on each side not reaching the anterior border; these bands are furthest ($2\frac{1}{4}$ mill.) apart near the respiratory orifice, from which point they converge posteriorly, and anteriorly by the bending of the band on the right side. Length of mantle $7\frac{3}{4}$ mill., breadth 4 mill. Respiratory orifice $3\frac{1}{4}$ mill. from anterior border. Body cylindrical, rounded and very blunt at end, not conspicuously tapering. Distance from posterior end of mantle to end of body, 8 mill. Body dark grayish-ochre above, with an indistinct pale dorsal line; sides paler. Reticulation distinct, with indistinct "foliations." Sole somewhat transversely wrinkled, but not differentiated into tracts. Jaw dark, strongly curved, blunt at ends, with about 10 well-marked ribs. Lingual membrane, with about 35-1-35 teeth; centrals tricuspid, the side cusps very small, laterals bicuspid, marginals with a large sharp straight point, and a small outer one. Compared with *P. humile* the centrals are slightly shorter and broader. Liver dark gray-brown.

Found by Mr. H. F. Wickham under logs in ditches by the roadside and damp places at Victoria, Vancouver Island, 1889.

This is a very distinct species, easily recognized by its color, the absence of dark bands on the body, the pale dorsal line, and the blunt posterior extremity.

Prophysaon flavum Cockerell, n. sp.

Length (in alcohol) 25 mill. Body and mantle dull ochreous, head and neck ochreous. Mantle tuberculate-granulose, grayish-ochre, pale at edges, and with black marbling or spots in place of the bands of *P. pacificum*. Length of mantle 11 mill., breadth $5\frac{1}{2}$ mill. Respiratory orifice 5 mill. from anterior border. Body cylindrical, hardly tapering, and blunt at end. Distance from posterior end of mantle to end of body, 14 mill. Body dark grayish-ochre above, with a pale ochreous dorsal line not reaching much more than half its length; sides paler. Reticulations distinct, "foliated." Sole with well-marked transverse lines or grooves, those of either side

meeting in a longitudinal median groove, which divides the foot into two portions. Liver pale grayish. "Uniform tawny as is *Limax flavus*. It stretches itself out in a worm-like shape unlike other species. Internal shell plate, jaw and tongue as in *Andersoni*." (W. G. Binney.)

Gray's Harbor, Washington. (Hemphill, 1889.)

This is probably a variety of *P. pacificum*.

***Prophysaon cœruleum*, n. sp.**

Length (in alcohol) $22\frac{1}{2}$ mill., in motion, 43 mill. Body and mantle clear blue-gray, paler at sides, sole white. Mantle finely granulated, broad, without markings. Length of mantle 7 mill., breadth 5 mill. Respiratory orifice $2\frac{1}{2}$ mill. from anterior border. Body subcylindrical, tapering, pointed. (In one specimen eaten off at the end.) Distance from posterior end of mantle to end of body, $10\frac{3}{4}$ mill.

The reticulations take the form of longitudinal equidistant lines, occasionally joined by transverse lines, or coalescing. Sole not differentiated into tracts. Jaw pale, strongly ribbed. Liver white. Mr. Binney sends me colored drawings of the living animal; the neck is long and white, or very pale. Mr. Binney has examined the jaw and lingual, and finds them as usual in the genus. Several specimens were sent from Olympia, Washington Ter., from Mr. Hemphill to Mr. Binney.

P. cœruleum is an exceedingly distinct species, distinguished at once by its color and the character of its reticulations.

***Prophysaon cœruleum* var. *dubium* n. var.**

Length (in alcohol) 8 mill. Length of mantle 4 mill. Distance from posterior end of mantle to end of body $3\frac{1}{2}$ mill. Mantle broad, with four bands composed of coalesced black marbling, very irregular in shape, and running together anteriorly. Body dark, tapering. Sole pale, its edges gray. Liver white.

With the *P. cœruleum* is a small dark slug, probably a variety of it, but differing as described above. It will easily be distinguished by its blackish color and the peculiar markings on the mantle.

***Prophysaon humile* Cockerell, n. sp.**

Length (in alcohol) $16\frac{1}{2}$ mill. Body above and mantle smoke-color, obscured by bands. Mantle wrinkled, and having a broad dorsal and two lateral blackish bands, reducing the ground-color to two obscure pale subdorsal bands. Length of mantle 7 mill., breadth

5½ mill. Respiratory orifice 2¾ mill. from anterior border. Body subcylindrical, somewhat tapering, rather blunt at end. Distance from posterior end of mantle to end of body 8 mill. Back with a blackish band reaching a little more than half its length, and lateral darker blackish bands reaching its whole length. Reticulations distinct, "foliated." Sole strongly transversely striate-grooved, but not differentiated into tracts. Jaw pale, strongly striate, moderately curved, not ribbed. Lingual membrane long and narrow. Teeth about 35-1-35. Centrals tricuspid, laterals bicuspid, marginals with a large point, and one (sometimes two) small outer points. Liver pale chocolate.

Found by Mr. A. F. Wickham under the bark of rotten logs in the woods around Lake Cœur d'Alene, Idaho, 1889.

In its reticulations, and general external characters, this species resembles *P. andersoni*, of which it is possibly a variety.

OCCURRENCE OF *HELICINA OCCULTA* SAY, IN BROWN CO., WIS.

BY GEO. T. MARSTON.

My first knowledge of the occurrence of this mollusk in Brown County, was in the spring of 1886, when I found a single "dead shell" on the shore of Fox river about two miles south of DePere.

Again, on May 13, 1888, I found five (5) specimens, all alive, upon the banks of a small creek which, rising in a limestone ridge about a mile from where the specimens were procured and about three miles east of DePere, flows into East or Devil River and eventually into Green Bay.

The shells were found, within a space of 300 feet, along the banks of this creek, the land above and below this being under cultivation. They were isolated and were obtained only after careful search, myself and an assistant going over the place frequently.

A week later when another search was made, and in the spring of 1889, no specimens could be found.

The little tract inhabited by this shell is very rich in land and fresh water mollusks, and seems to be a favorite resort of *Helicodiscus lineata*, which lives there in great numbers.

Green Bay, Wis., January 28, 1890.

ANNOTATED LIST OF THE SHELLS OF ST. AUGUSTINE, FLA.

BY C. W. JOHNSON.

Crepidula glauca Say. I think there is no doubt but that *C. glauca* and *C. convexa* are the same species—their form depending on the object upon which they have grown. But I doubt whether they are varieties of *C. fornicata*. In the series before me the following characters seem to distinguish them from the typical young of *C. fornicata*. Apex distant from the margin, septum thinner and less depressed.

Crepidula unguiformis Lam. Common.

Crepidula aculeata Gmel. Not common.

Scala angulata Say. Common.

Scala humphreyi Kiener. Common.

Scala multistriata Say. One specimen.

Scala turricula Sowb. Not common.

Scala lineata Say. Not common.

Ianthina fragilis Lam. A few after a storm.

Vermetus spiratus Phil. var. *radicula* Stimp. A few on the ocean beach.

Turbonilla areolata Ver. One specimen.

Odostomia impressa Say. Common on oysters.

Columbella lunata Say. Common upon sea weed.

Columbella avara Say. Common.

Cancellaria reticulata. A few sea-worn specimens.

Terebra dislocata Say. Common on the sand bars in the harbor.

Clathurella plicata C. B. Ad. Common among oysters.

Daphnella cerina Kurtz & Stimp. Common among the wash of small shells on the ocean beach.

Strombus pugilus Linn. A few sea-worn specimens. I have never seen a trace of *Strombus costatus* Gmel., in this locality. Bahama specimens are common in the shell stores. I have specimens from Lake Worth, Fla. (250 miles south).

Trivia pediculus Linn. Several sea-worn specimens.

Ovula uniplicatum Sowb. Common on the *Leptogorgia virgulata*, a species of *Gorgonia*. As this varies in color (orange, yellow, white and purple), the shells to a great extent partake of the color of the *Gorgonia* on which they live.

Ovula gibbosa Linn. One living specimen on the *Leptorgia*.

Cassis cameo Stimp. One sea-worn specimen on the ocean beach.

Semicassis sulcosus Brug. var. *inflata* Shaw. Rare.

Dolium galea Linn. Several broken shells. *D. perdix* is not found here.

Pyrrula papyraria Say. A few sea-worn specimens.

Natica pusilla Say. Common.

Natica duplicata Say. Common.

Sigaretus perspectivus Say. Not common.

Sigaretus maculata Say. Rare. I believe that this is identical with *S. Martinianus* Phill., of the West Indies. The only apparent difference is that the revolving brown bands of *S. martinianus* are irregularly divided into *maculations* by broad longitudinal lines which usually represent rest periods in the growth of the shell and are frequently on *S. martinianus*.

Pyramidella conica C. B. Ad. Several specimens.

Littorina irrorata Say. Common.

Littoria scabra L. var. *lineata* Gmel. Common on the sea wall but much smaller than those from the southern part of the State.

Cerithium atratum Born. Common around Marsh Island.

Cerithidea scalariformis Say. Common along the marshes west of the city.

Cerithiopsis greenii C. B. Ad. Common.

Cerithiopsis terebralis C. B. Ad. Common.

Triforis nigrocinctus C. B. Ad. Common.

(To be continued.)

A WORD TO YOUNG COLLECTORS.

BY JOSIAH KEEP.

We ought to feel a great veneration for the men who have gone before us, and who spent so much time and strength in preparing the way for those who were to follow. Whenever we take up the label of a shell and see the abbreviation "Linn." following the specific name, how it carries our thoughts back to the great Swedish naturalist who did so much to simplify the nomenclature and enlarge the domain of science.

And as we cannot exercise feelings of veneration and gratitude for mere names of unknown persons, it is well for us to become somewhat acquainted with the lives of the great naturalists whose initials meet us whenever we glance over our collections. For some of us, perhaps, this is not an easy task; but fortunately books and papers upon these subjects are becoming more common, and it is much easier now to obtain this information than it was a few years ago. Such names as Say and Gould and Binney, for instance, while they serve primarily to identify the terms which these authors applied to their species, may themselves be studied and identified; and as we learn more of their pure and earnest lives, we shall have a deeper respect and a more profound veneration for the men who studied and wrote before we were born, and who left us the fruits of their labors. Veneration for character and admiration for attainments are healthful feelings, and their free exercise speaks well for the youthful mind.

And not only for the dead, but also for the living naturalists we should cherish these feelings, and seek for information concerning their lives. Many of them in their youth experienced the same perplexities and encountered the same difficulties which beset some of us now, and as we learn of their victories we may be encouraged to more vigorous action.

But while we entertain these sentiments of respect and esteem for both the past and the present workers in science, it is well to remember two things.

First. The men and women who are to be eminent in science forty years hence are boys and girls now. Each year adds to the list of the honored dead. A few, like the venerable Isaac Lea, spend nearly a century among the scenes of their labors and pleasures; but others, like the lamented Tryon, are cut down suddenly, in the midst of active vitality. The ranks are being recruited, it is true, but the recruits must ever come from the young.

Second. Truth is greater than any of its expounders. While it is desirable to know the names which eminent men have given to the various species of mollusks which we collect, it is still more important to know their nature, their habits, their food, stages of growth, and changes, and to observe their motions and conditions of activity or repose. Where we cannot observe the living animal, we can at least study the shell, and notice its points of resemblance to others, also its differences; we can examine its structure, test its composition, note

its variation in different specimens, and endeavor to find out for ourselves its prevailing form and characteristics.

It may be that our investigations will lead us to conclusions differing from those which are commonly held ; in which case we have a right to modestly hold and express them, until the uncertain points are settled.

Finally, the motives which should induce us to study and collect shells are varied ; but among them may be mentioned the laudable desire to possess a series of objects which are of great beauty, both in outline and in color ; next, the wish to learn the form, nature, and habits of the creatures which belong to one of the great sub-kingsdoms of the animate world ; then an endeavor to study the questions relating to the real meaning of the terms genus, species, and variety ; how far they are natural and how far artificial ; and lastly, to study modern mollusks so that we may be fitted to understand and interpret the numerous fossil shells which figure so extensively in the geological records of this grand old planet.

NOTES ON SOME NORTHERN PUPIDAE WITH DESCRIPTION
OF A NEW SPECIES.

BY. DR. V. STERKI.

Of late, I have received, from a number conchologists in different parts of the country, many valuable Pupidae, partly sent for examination or determination, partly in exchange or cheerfully given for my collection, which now contains about 375 lots (of N. Am. Pupidae). But I need many more, especially of some difficult and doubtful species and groups, for a thorough study of this family. A part of these newer acquisitions are of so much importance, either systematically, or in habits, that a few notes about them may be welcome to the student of our malacological fauna. The latter becomes more and more interesting, as our knowledge of the distribution of the species is widening and their varieties and local forms are more numerous. But also new species have been found, and more doubtless will follow, as was and is to be expected from the immense area of our country, of which only a small part has been thoroughly investigated as to these little creatures.

Some species and groups are omitted here, although I have received highly valuable materials of them, partly because they need being studied further, partly as I intend to treat them separately.

Pupa fallax Say.

This species has been collected, in typical form, on Curacao (Mazyek Coll), a fact which may prove, that *P. modica* Gld. is not only a southern form of *fallax*.

Pupa arizonensis.

The shells sent out under this name by Gabb, or at least most of them, are known to be nothing else than *P. fallax*, e. g., those in Smithsonian Inst. Coll., in Coll. of the Acad. of Philadelphia. When I found nothing else, in several of the richer private collections, I also began thinking that *P. arizonensis* was nothing else than a synonym of *fallax*, in spite of the description and even more the figure in Binney's work, which seemed to point to something of another kind. But since I have seen the (only) type specimen of that fig. in B. & B. Coll. (Central Park Mus., N. Y.), I know that there is really such a thing as *P. arizonensis* existing. The specimen is somewhat weathered, somewhat grayish-white, the epiconch lost—so that the original color cannot be determined exactly—but otherwise in good condition. It is best compared with *P. corticaria*, of the same shape, but larger (alt. 3, 5 m.), has no trace of lamellæ, and a thickened lip. Now, a short time ago, I received, by the kindness of Mr. L. B. Elliott, of Iowa City, a few examples of this same species. They had been collected, as Mr. E. writes, "at Siligman, Arizona, by an entomological friend, in the nests of large and fierce ants, used as materials to build the nests." They were also somewhat weathered, but fair. And again Mr. Elliott sent me a number of Pupidae, collected at Albuquerque, New Mexico, highly valuable things, among which there were 2 examples of our species, in the same condition. One of the Arizona specimens still bears its epiconch and the color is a pale horn; all have rather fine, remote, rib-like striae, more crowded near the aperture.

A controversy may arise about the name: Whether Gabb has seen this shell, is not sure, but very improbable; his own description¹—not to speak of the originals mentioned above—doubtless refers not to this species, but a form of *P. fallax*, not differing even as a var. from the type. On the other hand there is no doubt but that the descrip-

¹ 7 Am. Journ. Conch. II, p. 331, Oct. 1, 1866, pl. 21, f. 6.

tion and figure in Binney's work represent this species, and consequently are the first authentic publication. Thus, in my opinion, we have to write: *P. arizonensis* Binney.

Pupa holzingeri Sterki.

This species has a very wide range of distribution in the north-west and west. I found 2 exa. among Pupidae from Helena, Mont., sent by Mr. T. B. Elliott, and one in the lot already mentioned from Albuquerque, N. M., not much different from Illinois exa. In this regard it seems to resemble its relatives, *P. contracta* and also *armifera* which are remarkably constant all over the country, while some other species show a decided variability even in the same place.

Pupa curvidens Gould.

From my studies, during about 5 years, of my own exa. (22 lots of *curvidens* 34 of *pentodon* from all over the country) and a good many other collections, altogether thousands of specimens, I became satisfied that this species is to be taken up and separated from *P. pentodon* Say. It is smaller, almost always more slender, and the whorls are more slowly increasing, so that the last is relatively smaller and less predominating than in *pentodon*. Quite generally, there is, on the palatal wall near the aperture, a marked crest, and behind that an impression, deepest at the place of the inferior palatal lamella. The lamellæ are nearly the same in both, and decidedly variable as to their number (except the typical, apertural, columellar, basal and the two palatals) but by far more so in *curvidens* than in *pentodon*.

A marked difference is in the station of the two. While *pentodon* prefers low, moist localities, in company of *Vertigo ovata*, most *Hyalinias*, the tumid, smooth form of *Carychium* (*exiguum* Say), *curvidens* is found more in "upland" places, even on banks, steep slopes, together with *Vert. bollesiana* Morse, *Hyalinia exigua* Stimpson and the slender, regularly striated *Carychium*, where rarely or never a *Vertigo ovata* will be found. It is our commonest Pupa, here and in other parts of Ohio. *P. cincinnatensis* Judge is identical with it.

On a gravelly bank at New Philadelphia there is a peculiar form of our species; long, slender, nearly cylindrical, with only 5 typical lamellæ, no accessory ones; the color is somewhat greenish, and in weathered specimens not so white as in the type. The same form has been collected at Sewanee, Tenn., by Mr. Sanderson Smith, with

the common, or typical, form : and it probably will be found elsewhere. It is so characteristic that I thought it not out of the way to name it *var. gracilis*.

P. curvidens is found nearly everywhere east of the Rocky Mountains, but it seems to go not quite so far west and north as *pentodon* does.

(*To be continued.*)

GENERAL NOTES.

A party of naturalists from the Academy of Natural Sciences of Philadelphia sailed from New York on the 16th of February, for Yucatan and Southern Mexico. Extensive collections of plants, mollusks, birds, insects, etc., will be made, and volcanic and other geological phenomena studied. Prof. Heilprin, Messrs. Stone, Ives, Baker and Lebouillier make up the *personnel* of the party.

We are indebted for the illustrations in this number of the NAUTILUS to Dr. W. D. HARTMAN, of West Chester, Pa., author of the excellent little book, "*Conchologia Cestrica*,"—now becoming scarce—and of numerous papers on *Partula* and *Achatinella*. Some months ago we had the pleasure of going over the Doctor's collection of these beautiful shells. In completeness it is certainly one of the first rank, surpassing, probably, any other collection of these two genera. In *Helicina*, *Melania* and South Sea *Helices* it is also very rich.

Prof. H. A. WARD, of Rochester, N. Y., spent a few hours with us recently. During the past year Prof. Ward has collected extensively on the West Coast of South America and visited the Exposition at Paris.

WANTED.—Correspondents interested in Corbiculidae. Also *Helices* of Cumberland subregion. Offered: *Limnaea Adelinae*, *Glyptostoma Newberryanum*, *Lucapina crenulata*, *Monoceros panciliratium*, etc.

EDWARD W. ROPER, Revere, Mass.

ERRATA.—In the January NAUTILUS the following corrections should be made :

p. 102, 10th line from top, for "West" read "Wet."

p. 102, 5th line from bottom, for "Chester" read "Custer."

p. 103, 20th line from top, for "West" read "Wet."

A blunder also occurs in the name of Mr. M. Burton Williamson, University P. O., Cal.

THE NAUTILUS.

VOL. III.

MARCH, 1890.

No. 11.

ON A NEW SPECIES OF TYLODINA

BY WM. H. DALL.

In my Report on the Blake Gasteropods I have (p. 60, pl. xiv, figs. 9, 10) described and figured a shell, which, in the absence of the soft parts, I was obliged to refer doubtfully to the young of *Umbraculum* or *Tyrodina*, under the head of "*Umbraculum bermudense* Mörch?"

This shell now proves to be a genuine *Tyrodina*, different from the species of the Mediterranean or of California, and which may take the name of *T. americana*. The shell which was well figured as above, in life has a membranous extension 3-5mm. wide around the margin, continuous with the epidermis. The latter is smooth and pale with radiating broad purplish rays of color. The animal is much smaller than that of *T. Rafinesqui* in proportion to the shell, which abundantly covers it, and it emits a dark purple dye. It does not seem to differ essentially in the superficial characters of its soft parts from the species of the Mediterranean, which, however, has not been very well figured. The gill is attached to the edge of mantle on the right side. The other characters are much as stated in H. & A. Adams' generic description of the genus (Gen. Rec. Moll. II, 42).

The Blake specimen was obtained off Havana, dead, in 80 fathoms. The present specimen was obtained on the northern border of the Gulf of Mexico by the U. S. Fish Commission at Station 2406, in 26 fathoms, coarse sand and broken coral, on the line between the mouth of the Mississippi River and Cedar Keys, Florida.

This enables us to add this interesting genus to the fauna of the United States. At a more convenient season I hope to describe and figure the soft parts and dentition, but at present can only notify the conchological world of its discovery and identification.

A NEW AMERICAN BULIMULUS.

BY H. A. PILSBRY.

Some weeks since Mr. Averell, Business Manager of the NAUTILUS, placed in my hands examples of a *Bulimulus* differing notably from all other American species, and which, in his opinion, was new. Upon writing to Mr. G. H. Ragsdale, of Gainesville, Texas, from whom the first specimens were obtained, I received six more in addition to Mr. Averell's. I propose for the new form the name *BULIMULUS RAGSDALEI*. It is about the size and form of *B. schiedeanus mooreanus* W. G. B., but rather more slender and elevated. The surface is not smooth, as in other American *Bulimuli*, but strongly ribbed-striate longitudinally. The apex is blunt; outer lip thickened within; columella reflexed over the narrow but open umbilicus. The aperture is less than half the entire height of shell. Whorls $6\frac{1}{2}$.

Alt. 22, diam. 10 mill.; alt. of aperture $10\frac{1}{2}$, diam. 7 mill.

Color, brownish corneous, somewhat translucent, the riblets opaque white.

Mr. W. G. Binney writes as follows of the specimens submitted to him:

"There is in my mind no doubt of their deserving a specific name—unless, indeed, you are in possession of examples showing a gradual change from the usual sculpturing to these ribs. It is not often one gets so interesting a form to describe! Is it not nearer to *dealbatus* than *Schiedeanus*?"

No specimens showing a transition to *B. dealbatus* or *schiedeanus* were found; nor have I ever seen any, although I have collected thousands of *Bulimuli* in Texas and examined many hundreds more collected by Singley, Sampson and others, from Kansas and Arkansas to the Rio Grande. Mr. Ragsdale writes me the circumstances of its finding as follows:

"I send by this mail more of the *Bulimulus* you ask about; they are all dead shells. I could find no living ones; and have found these only in Cook and Montague Counties, Texas, at the top of the Red River Bluff, associated with the small shell (*Helicina orbiculata*) inclosed. The large *Helix* inclosed (*H. roemeri*) was at the foot of Bluff in the Red River Bottom. The *Bulimulus* was discovered by myself one mile north of St. Jo, Texas, in 1888, and again at the lower end of Warren's Bend, 25 miles N. W. of Gainesville, Texas, December 28, 1889."

An illustration will be given later.

ON SOME NORTHERN PUPIDÆ, WITH DESCRIPTIONS OF
NEW SPECIES.

BY DR. V. STERKI.

Pupa pentodon, Say.

Not very much is to be added to the foregoing. It may be said, that this species is not so generally found with such a pure glassy shell, as *curvidens* when fresh and living, but more or less opaque or spermaceti white. It is decidedly variable in size and also in shape, being shorter, and more tumid or conical, in decidedly wet localities. I have a specimen from Helena, Mont. (Mr. Elliott), and several from Ottawa, Ont. and Winnipeg, Manitoba (sent by Mr. Geo. W. Taylor). Those from the latter locality are long and slender with a very strong callus inside of the parietal wall, in which the lamellæ are in appearance nearly buried.

Pupa Pilsbryana n. sp.

Among a few examples of the smaller form of "Pupa hordacea Gabb" now described by Mr. Pilsbry as *hordeacella* from Arizona, in Mr. W. G. Mazyck's collection, there was one specimen of an evidently new species, well formed and mature, and fresh although dead. Possibly there are more such in lots of the species mentioned above and sent out by Gabb. A few days ago among Pupidæ from Albuquerque I found 4 examples, although somewhat different, evidently being of the same species, which consequently is confirmed. Known from the region of the Rio Grande del Norte, and that of the Colorado River, and being doubtless distinct from all the species described, it is to be brought to general knowledge under a new name,

for which I propose that of Mr. Pilsbry, the active student of our Pupidae, to whom I am indebted for a number of valuable specimens and facilities to examine such.

Description: Shell minute, narrowly perforate, cylindrical-oblong to cylindrical, somewhat attenuated towards the rather blunt apex, colorless (when fresh glassy) with a very delicate bluish tint, smooth and polished, with few, irregular, microscopic striae which are more marked near the aperture. Whorls $4\frac{1}{2}$ – $5\frac{1}{2}$ moderately rounded with a rather deep suture especially in the upper half, regularly and slowly increasing, the embryonal being relatively large, the last somewhat ascending toward the aperture; the latter of moderate size, lateral, subovate, margins approached, peristome somewhat expanded without a thickened lip or a callus in the palatal wall; outside is a barely perceptible trace of a crest near the margin and behind that a slight impression most marked upon the inferior palatal fold. Lamellæ 4 or 5; one apertural, rather high of moderate length, simple; one columellar, horizontal, of moderate size, simple; basal very small or wanting; palatals the typical, inferior deeper seated, of moderate size, superior small or very small.

Alt. 1.5–1.7; diam. 0.8–0.9mm.

There is a slight variation; the example from New Mexico being of lesser diameter, and having no trace of a basal lamella.

The soft parts have not been seen so far, but will be of high interest, since, to judge from the shell, our species seems to be an intermediate form between the *hordeacella*, etc., group, and *P. curvidens*, especially its var. *gracilis*.

P. Pilsbryana has much resemblance in shape and size to small, albino examples of *P. hordeacella* Pilsb., but, under a glass, is at once distinguished by the shorter, simple apertural lamella not ending at or very near the upper termination of the palatal margin, as it is in *hordeacella*, and by the smooth surface; the fine bluish hue may also be a distinguishing character if it prove constant.

Vertigo (?) *variolosa* Gould.

So far as I know, no specimen of this species from the continent is existing now in collections, that or those in the B. & B. collection having been lost sometime; but in the same, among a number of *P. contracta* Say, from Jamaica, one has been detected lately. Mr. Henry Moores of Columbus, Ohio, has had one example from Cuba, collected some 35 years ago by John Bartlett, and he was kind enough to lend it to me. It is more conical than in the figure and there are two

lamellæ in the palatal wall, yet there is hardly a doubt but that it represents Gould's species. Messrs. Geo. W. & P. B. Webster took much pains, last fall and winter, on their trips in eastern Florida, to secure specimens, but so far did not succeed. Whoever visits the Peninsula should look after it.

From the whole configuration and especially the lamellæ, *variolosa* appears to be a *Vertigo*.

***Vertigo gouldii* Binn.**

The true *V. gouldii*¹ has been collected at Helena, Mont., by Mr. I. B. Elliott, and at Ottawa, Ont., by Mr. Geo. W. Taylor; from the latter place in 2 somewhat differing forms. To mention it here, my *V. callosa* has not been found South of New York, nor west of middle Ohio, so far, to my knowledge, and among hundreds of small Pupidae collected in Northeastern Ohio, by Mr. A. Pettingell, there was no example of that species.

***Vertigo binneyana* Sterki.**

When this species was first published,² I had only 2 examples from Helena, Mont., and 2 from Winnipeg, Manitoba, but was satisfied that it is a distinct form. Since then I have seen 2 from Glendive, Mont., and one from Albuquerque, N. Mex., the latter differing somewhat from the northern example, but unmistakably ranging with them. Thus it seems to live in the whole region of the western mountains.

***Vertigo bollesiana* Morse.**

Specimens have been collected at Sewanee, Tenn., the most southern habitat on the continent I know of, by Mr. Sanderson Smith. But a short time ago I saw, in a number of *P. servilis* Gld., from St. Croix, W. I., one example of this species, with rather strong lamellæ. Whether it was collected with its companions or later accidentally mixed in, is hardly to be decided otherwise than by other specimens brought from the West Indies.

The species is variable. Most examples from New York, Ohio, etc., are of good size, regularly striate, and of chestnut color, while those from New England and Canada are generally smaller, lighter in color and scarcely striate or nearly smooth; the inferior columellar (or "basal") lamella is sometimes quite small or even wanting. A peculiarity of

¹ Sterki, four new *Vertigo* sp. in Proc. Acad. Phila., 1890.

² L. c.

this species is a very small, nodule-like supra-apertural lamella ; but by no means constant, very often just a trace or entirely wanting. In its European equivalent, *V. substriata* Jeffr., this lamella is well formed and constant.

ON THE GENERIC POSITION OF *ARION FOLIOLATUS*, GOULD.

BY T. D. A. COCKERELL.

After remaining unknown and almost mythical for nearly forty years, the *Arion foliolatus* of Gould has been rediscovered by Mr. Henry Hemphill, in Washington Territory. Specimens were sent to Mr. W. G. Binney, which had been found near Gray's Harbor and at Olympia, and which are referable to two different forms, as follows :

Arion foliolatus Gould, type. One specimen agreeing with Gould's description and figure, from Olympia.

Arion foliolatus var. *hemphilli* W. G. Binney. Six specimens from Chehalis River, near Gray's Harbor. These slugs are described by Mr. Binney as "Bright yellow with bluish-black foot and edge of foot ; reticulations dark reddish fawn." The genitalia also differ in some details from the type, but this may be partly due to a different degree of maturity.

Mr. Binney has kindly sent me the internal shell, genitalia, and skin of the typical example, as well as drawings of both, and copious notes, and at his request I offer a few remarks on the generic position of the species.

From the material I have examined, I should certainly have regarded the slug as a *Prophysaon* with affinities to *P. hemphilli*. But the Olympia example has lost the end of its body,¹ and the

¹ Mr. Hemphill, in his letter to Mr. Binney, relates of this example :—"When I found the specimen I noticed a constriction about one-third of the distance between the end of the tail and the mantle. I placed the specimen in a box with wet moss and leaves, where it remained for 24 hours. When I opened the box to examine the specimen I found I had two specimens instead of one. Upon examination of both I found my large *Prophysaon* had cut off his own tail, at the place where I noticed the constriction, and I was further surprised to find the severed tail piece possessed as much vitality as the other part of the animal. The ends of both parts at the point of separation were drawn in as if they were undergoing a healing process." When the box containing the slug reached Mr. Binney, the tail-piece was decomposed.

special generic character, the caudal mucus pore, is lost. This, however, undoubtedly existed, for it is indicated in Gould's description, and Mr. Binney informs me that it is present in the examples of var. *hemphilli* from the banks of Chehalis River. Hence the slug cannot be a *Prophysaon*, and the question arises, is it an *Arion*? From the peculiar reticulation, the position of the genital orifice, the shape of the penis-sac, and the general character of all its parts, I think we may safely say that it cannot be placed in *Arion*, nor does it agree with any other described genus. We have therefore no option but to propose a new generic name for it.

Phenacarion¹ n. g.

Animal limaciform, tapering, resembling a *Prophysaon*, but possessing a caudal mucus pore or pit. Respiratory orifice on right anterior side of mantle, about one-third of its length from the anterior border. The mantle conceals a thin and subrudimentary calcareous plate, easily fractured. The sole is not differentiated into parts. Genital orifice behind right tentacle. Jaw with numerous ribs. Penis sac elongate, cylindrical, thick, not tapering.

The mantle of *Phenacarion foliolatus* is quite long, with the shell situated near the respiratory orifice. There are black markings and spots as figured by Gould. The body has large elongate or irregular reticulations, the interspaces being minutely reticulated to give the foliated effect on which the specific name was based. The edge of the foot has dark transverse lines, alternating with paler lines, much as in *Arion ater*. The sole is transversely and somewhat obliquely grooved, but there is no separate locomotive disc. The jaw has about 23 ribs, denticulating either margin. The genitalia are much like *Prophysaon*, and decidedly different from *Arion*. The testicle (ovotestis) is somewhat subdivided. The vas deferens enters at the end of the penis sac.

Mr. Binney's notes concerning the typical *P. foliolatus* give "general color of animal reddish-fawn, also of reticulations. On the lower edge of the mantle, along the back from end of mantle to tail, and above the edge of the foot, is a lighter band, and also on top of neck almost to base of tentacles. The light band on edge of mantle is irregularly speckled with reddish dots. Mantle minutely tuberculated. The oblique perpendicular lines on edge of foot alternate wide and narrow."

¹ phénax—an impostor; *Arion*.

Phenacaron might almost be a variety of *Prophysaon hemphilli*, except for the generic character. Possibly Prof. E. D. Cope would regard this as an instance of "the same specific form" existing "though a succession of genera," which he has regarded as probable in his "Origin of the Fittest" (quoted by Wallace, "Darwinism," p. 421). Indeed, it not very rarely happens that almost the only difference between two species is a generic one. Good instances of this are afforded among the *Hymenoptera*, e. g., the resemblance of *Vipio coloradensis* Ashm., to *Agathis vulgaris* Cress., is almost exact on superficial examination. Except the generic and family characters, the *Agathis* is only a little larger with entirely fuscous wings, and the posterior femora and tibiæ mostly orange—peculiarities which might elsewhere be varietal only.

NOTE.—Mr. Cockerell writes me that he now regards *Phenacaron* as a subgenus of *Prophysaon*.—Ed.

A FEW LAST WORDS ON CREPIDULA.

BY JOHN FORD.

In my article on *Crepidula* published in the 8th number of the NAUTILUS, I endeavored to show that the shells described by Say as *C. glauca* were altogether distinct from the *C. fornicata* of Linné, and therefore the name should have been retained in Bulletin No. 30 of the National Museum recently published by Dr. Dall, instead of discarded. As in the following number their distinctness from *fornicata* was acknowledged by Dr. Dall, no further evidence seems necessary to sustain it.

The assertion by him however in the same issue, that the series of shells presented by me to the National Museum under the name of *C. glauca* "are distinct from *C. fornicata* but that they do not show the characters called for by Say's description," does, perhaps, challenge further remark; since it appears to be partly correct and partly conjectural. They are certainly not *C. fornicata*, but they as certainly do embody every character called for by Say's description of the true *C. glauca* written in 1821-2, and published in Vol. 2, Journal of the Academy of Natural Sciences of Philadelphia; also in Say's Conchology of the United States.

It is possible, as Dr. Dall asserts, that the series in question are depressed specimens of *C. convexa*;—the extreme convex form of which he supposes to be caused by growing on the rounded surfaces of small univalves, but I do not think it at all probable.

Quite a number of those in my own collection were taken from small univalves but they are precisely the same in character as the series alluded to, and, like them, are labeled *C. glauca*, Say. As a matter of fact the peculiarly arched forms known as *C. convexa* are very rare on our immediate coasts, while those described as *C. glauca* are comparatively plentiful.

Why should there be this disparity in numbers? It surely cannot be for the want of those "roosting conditions" so needful to the growth of *C. convexa*, since it is well known that the small univalves of our region greatly outnumber the large ones.

Though many hundreds of the former have been examined by me I have never seen a *C. convexa* upon them. I have also scanned every available point on the New Jersey coast scores of times within the last twenty-five years, and during all of that period have secured but six specimens (all dead), corresponding to Say's description of *C. convexa*.

This fact of course proves nothing; nevertheless, until further evidence to the contrary is adduced I shall deem it prudent to consider them two distinct and well-marked species.

Should they, however, eventually prove to be the same, even then, as my friend, Mr. H. A. Pilsbry, has stated, the name *C. glauca*, having precedence over *C. convexa* in Say's original paper, must always stand for the type form, and be entitled therefore to a "place of honor" in all monographs of the genus.

Young Collectors' Department.

COLLECTING LAND SHELLS IN EASTERN NEW YORK.

BY W. S. TEATOR.

(Continued from February No.)

More careful hunting under the logs will bring to light good specimens of *Zonites arboreus*, *indentatus*, and *viridulus*; the last two rather scarce. Also a few *Zonites fulvus*, *H. labyrinthica* and

pulchella, and *Pupa contracta*; but they are more partial to swampy situations, and with other small species are found in great numbers in certain places farther back in the country. Just one dead shell of *nitidus* has been taken—near the water, and it would seem to be a splendid locality for them. The *albolabris* is worthy of special mention on account of the superior size to which they attain: very seldom are they less than 30 mill. in diameter, while one shell measures 36. The *H. palliata* also are very perfect.

From the lower end of these woods to the 'Vly' is but a short distance; a long narrow strip of woodland lies on the north side of the causeway and forms the entire south shore of the cove. Here the conditions are much different; the ground is not over a foot or two above the high tides, and portions of it are occasionally inundated. The soil is of rich black mould with clay substratum, and has produced a dense growth of trees, principally elm; and a luxurious, almost tropical, undergrowth of shrubbery, ferns, and weeds.

Here lives and flourishes a colony of *Succinea obliqua* that is peculiarly interesting. During the warm months, May, June, July and August, they are wonderfully abundant. After the rains they are swarming over everything; feeding on the decaying rubbish, crawling on the weeds and bushes, going up the trunks of trees, and disporting themselves generally as if they really enjoyed their existence. Sometimes I have observed eighteen or twenty large fellows gathered around the foot of a tree as if on the point of a forward march of ascension. They never go very high however; I have not noticed them beyond five or six feet from the ground. Nor do they confine their attention to the woods; for in an adjacent large meadow many of them may be found traveling in the deep grass, some as much as a third of a mile away on the hillsides. So congenial are all the conditions surrounding them that they grow to surprising proportions; the best shells average 24 to 25 millimeters, often exceeding this. I have recently obtained one that is 28 mill. long. Mr. Pilsbry, to whom I sent a few specimens, says of them, "they are simply phenomenal in size." Mr. Binney tells me one rarely meets such large ones. The greatest length he mentions in his *Manual of American Land Shells* is 25 mill. Toward the latter part of summer the older ones die off rapidly, and late in the fall very few of them can be seen—but some of course survive the winter, while plenty of young will be left in the field for another year, which

hibernate so carefully that one is amazed when spring opens to find such armies of them.

Living along with *Succineæ* are *H. thyroides* and *alternata*; shells of the former quite pretty, some of them delicate pink color, and a number of specimens are encircled with two or three bands of white, seemingly eroded. *Macrocyllis concava* and *Zonites fulvus* also occur. *Pupæ* are scarce; I have only seen a few *contracta* and *pentodon*. In the



H. thyroides.



wettest parts of the woods, in the moss, great numbers of *Pomatiopsis lapidaria* can be gathered; also *Carychium exiguum*; and in the cove and river in the near vicinity are twenty or more species of fresh water shells, many of them of excellent quality.

During the early part of the present winter, as frosty days were quite the exception, I visited "Almont" frequently for collecting, all of them delightfully successful trips. Have gleaned much of interest regarding the hibernation of the different snails there found. Here are my notes for the 7th of January this year:

"Particularly numerous at this time are *H. palliata*, though not so easily found as in summer. They are invariably closed with the epibragn, lying aperture upward, looking very pretty when first exposed to the light, their pearly white lips contrasting beautifully with the dark epidermis. Old bark nests seem to be a favorite place for them to congregate for winter. Sometimes they will be found singly, often five or six grouped together; and at times as many as twenty or thirty distributed about a single little vicinity. A situation of this sort is often chosen by *H. monodon* (*fraterna*); this species can thus be found to the extent of twenty or more individuals in a cluster wintering along with *H. palliata*. Once in a while the collector is pleased by the finding of a large *Zonites fuliginosus*



Z. fuliginosus.

buried his whole depth in the ground, and nothing visible save the membranous covering over the aperture. *H. albolabris*, usually so plentiful in the warm season is now apparently very scarce; not over a half dozen live ones found this winter, and they were among the leaves, partially imbedded. In another wood near here the boys while raking

leaves late last fall obtained for me about one hundred specimens hibernating in the same way. *H. thyroides* at this time is occasionally gotten here and more especially at the 'Vly,' mostly buried in the earth. In a few instances I find the animal out and crawling, observed them to-day, and on the 26th of December. A cluster of very well-developed *fulvus* was obtained on the latter date under stones near tide water. A goodly quantity of *S. ovalis* was gathered a while ago, among and attached to broken rushes between the tides (dormant); but their number has greatly decreased since last summer."

Thus the region is more than doubly interesting to the conchologist, and it is one of the fields to which I have given considerable attention.



Z. fuliginosus.

GENERAL NOTES.

The party of scientists in Mexico from the Academy of Natural Sciences of Philadelphia are now in the neighborhood of Vera Cruz. When last heard from they were about to make an ascent of the volcano of Orizaba; after which they will travel inland.

I find *Helix clausa* abundant in vacant lots within the city limits of St. Louis. Found a dozen last summer clinging to leaves of elder berry bushes (*Sambucus canadensis*) at a height of six feet or more from the ground.—G. D. LIND, St. Louis, Mo.

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DESCRIPTIONS OF NEW VARIETIES OF NORTH AMERICAN LAND SHELLS.

BY HENRY HEMPHILL.

(1.) *Patula strigosa* Gld. var. *subcarinata*.

The shell in general form resembles a large coarse elevated or depressed Cooperi. It has six whorls, well rounded above and beneath, and subcarinated at the periphery. The body whorl has two revolving dark bands, one above and the other below the periphery; sometimes the upper band spreads over the shell to the suture forming a dark chestnut zone that fades out as it passes toward the apex. The lip is simple, thickened, its terminations joined by a callus; aperture obliquely subangulate; the suture is well impressed.

Height of the largest specimen 1 inch, breadth $1\frac{1}{2}$ inch.

Height of the smallest specimen $\frac{3}{4}$ inch, breadth 1 inch.

Habitat, Rathdrum, Idaho.

(2.) *Patula strigosa* Gld. var. *bicolor*.

This shell is a colored variety of the above.

It may be characterized as being of a general dark horn color mingled with dirty white; there are occasional zones of dark horn color above and fine dark lines beneath, but no defined bands. In some of the specimens the light color prevails, in others the horn color spreads over the shell in irregular patches.

Height $\frac{7}{8}$ inch, breadth $1\frac{1}{8}$ inch.

Habitat, Rathdrum, Idaho.

(3.) *Patula strigosa* Gld. var. *lactea*.

This is a beautiful clear milk-white shell, with $5\frac{1}{2}$ whorls, sub-earinated at the periphery. In the elevated forms the aperture is nearly circular, as broad as high; but in the depressed forms the aperture is broader than high, obliquely subangulate. The lip is simple, thickened, its terminations joined by a heavy callus,—the thickening of the lip and callus is a shade darker than the body of the shell.

Height of the largest specimen 1 inch, breadth $1\frac{1}{8}$ inch.

Habitat, Rathdrum, Idaho.

The above varieties represent a colony of the largest specimens of the *Strigosa* group that I have collected. They are an important and very interesting addition to the series, and serve to confirm my previous views on the relationship of what I call the *Strigosa* group. This colony inhabits open places in the dense pine forests of the mountains, overgrown with deciduous bushes. They hibernate among leaves, brush and roots of trees and in protected and secure places, generally on the north slopes of the mountains.

(4.) *Patula strigosa* Gld. var. *jugalis*.

Shell umbilicated, depressed with numerous prominent oblique striæ; spire very moderately elevated or depressed; whorls $5\frac{1}{2}$ somewhat flattened above, but more convex beneath, the last falling in front, with two dark revolving bands, one at the periphery and the other above; the body whorl subearinated at its beginning but more rounded as it approaches the aperture; suture well impressed; color ashy white with occasional horn colored stains; umbilicus large, pervious, showing the volutions; aperture oblique, ovate, but in very depressed specimens the aperture is at right angles with the axis of the shell; lip simple, thickened, its terminations approaching and joined by a thick heavy callus, making the lip in very adult specimens continuous.

Height of the largest specimens $\frac{1}{2}$ inch, breadth 1 inch.

Height of the smallest specimens $\frac{6}{16}$ inch, breadth $\frac{1\frac{1}{8}}{16}$ inch.

Habitat, Banks of Salmon River, Idaho.

This is another interesting form of the very variable *strigosa*. It inhabits stone piles, and other places where it can find shelter and protection against the fatal rays of the summer's sun, close along the banks of the river. It is interesting on account of its very depressed form and the ovate form of the aperture, the heavy callus, joining or "yoking" together the extremities of the lip.

(5.) *Patula strigosa* Gld. var. *intersum*.

Shell umbilicated, sublenticular, depressed, thin, dark horn color, more or less stained with darker chestnut. Whorls $5\frac{1}{2}$ or 6, somewhat flattened above, more convex beneath, obtusely carinated at the periphery and bearing numerous coarse oblique rib-like striae, and two dark revolving bands; suture well impressed; umbilicus large, pervious; aperture oblique, subangulated; lip simple, thickened, its terminations joined by a thick callus.

Height of the largest specimen $\frac{1}{2}$ inch, breadth $\frac{3}{4}$ inch.

Height of the smallest specimen $\frac{5}{16}$ inch, breadth $\frac{7}{16}$ inch.

Habitat. Bluffs along the banks of little Salmon River, Idaho.

REMARKS.—This shell inhabits stone piles at the foot of a steep bluff back some distance from the river. It seems to be quite rare as I found but few specimens during the two or three days of my stay in its vicinity, and many of them were dead. I regard it as one of the most interesting shells found by me during the season, for it combines the depressed angulated or keeled forms of the *Haydeni* side of the series, with the sculpturing of *Idahoensis*, two shells representing opposite characters in every respect. It thus becomes the companion of *Wahsatchensis*, a beautiful shell combining the same characters, but much more developed and connected with the large elevated forms. Var. *intersum* fills the opposite office by uniting these characters with the small depressed forms. Taken as a whole, this series of shells as now completed, seems to me to offer the best guide or key to the study of species that the student can have. Every known external character belonging to the genus *Helix*, is so gradually modified and blended with opposite characters, that if one had the molding or making of the many and various intermediate forms, he could scarcely make the series more complete than nature has done herself.

NOTES ON SOME NORTHERN PUPIDAE WITH DESCRIPTION OF A
NEW SPECIES.

BY DR. V. STERKI.

Vertigo tridentata Wolf.

Has a wide distribution in the northern part of the country; originally found in Illinois, it has been collected in different parts of

Ohio and New York, as well as in Minnesota and Colorado. In general it is remarkably constant in its characters; yet there are slight differences; here I found a few examples from low ground, together with *V. ovata*; they were a trifle larger, with a thicker and deeper colored shell than those from upland places.

Vertigo Oscariana Sterki.¹

In drift with numerous minute shells, from Guadalupe River, Texas, kindly sent by Wm. A. Marsh, I found one specimen of this species, which, consequently, is not confined to eastern Florida, where it was detected by Messrs. Webster, but may be widely spread over the southern part of our country.



It may be appropriate to add here some notes concerning a few forms of *Vertigo* which, in my opinion, represent new species, but of which the specimens extant are not sufficient for a formal publication. By this, I expect to obtain, possibly, more material in order either to confirm the species or refer the forms to their nearest relatives.

In 1887, Mr. A. A. Hinkley, of DuBois, Ill., sent me, with other Pupidæ, one specimen of a *Vertigo*, probably new, and in 1889 another of the same; the said gentleman and Mr. Wm. A. Marsh kindly forwarded me all their Pupidæ, for examination, but so far I found no other example; yet I am satisfied such will be found. The form is related to *Vertigo ovata* and *Gouldii*, but different and is characterized by the two palatal lamellæ being close together, for what reason I gave it the mss. name *V. approximans*.

Among several hundred small Pupidæ collected in Northeastern Ohio (Summit and Lake counties) by Mr. A. Pettingell, there were two examples of a doubtless new species, which I in the same way named *V. parvula*. It is about of the size, shape and appearance of *V. (Angustula) milium* Gld.; but ranges in quite another group, having a quite simple palatal wall and margin, and only 3 lamellæ.

In Texas, *Vertigos* seem to be decidedly rare. In many hundreds of Pupidæ from that state Mr. J. A. Singley and Mr. Wm. A. Marsh kindly forwarded me, there were only about half a dozen such; a few *milium*, one *rugosula*, m, one *oscariana*, as mentioned above, and one specimen of a form which probably will prove to be a new species of quite a peculiar formation.

¹ L. c.

One single specimen of a decidedly new and interesting form was among those Pupidæ from Albuquerque, N. M., sent by Mr. L. B. Elliott. The whole formation is that of a *Vertigo*, but it is purely albino (*i. e.*, colorless or white); the only one of this kind in the genus. Its altitude is 1.6 mm.; the lamellæ are nearly those of *V. Binneyana*, but the palatal wall has quite a different configuration, and the whorls except the last are regularly striate.

New Philadelphia, Pa., Feb. 10, 1890.

ANNOTATED LIST OF THE SHELLS OF ST. AUGUSTINE, FLA.

BY C. W. JOHNSON.

Bythinella tenuipes Couper. Common in a small stream near the city and at Tocoï on the St. John's River.

Amnicola granum Say. Common in the upper part of Moultrie Creek.

Paludina georgiana Lea. Common in tributaries of the St. John's, west of St. Augustine.

Campeloma lima Anth. Found with the above, but not as plentiful.

Ampullaria depressa Say. Common with the two preceding species. A less depressed variety is found in a swamp near Matanzas Inlet.

Helicina orbiculata Say. Common.

Nerita peloronta L. One living specimen on the water battery of Fort Marion.

Nerita versicolor Lam. Two living specimens. I believe this is the most northern locality recorded for *Nerita* on the Atlantic Coast.

Neritina reclinata Say. Common at the mouth of small fresh water streams.

Neritina virginea L. A number of specimens found in brackish water near Matanzas.

Fissurella alternata Say. Common.

Actæon punctatus d'Orb. One specimen.

Tornatina canaliculata Say. Not common.

Aplysia protea Rang. Common at low-water on a bar at the mouth of Hospital creek.

Glandina truncata Gmel. Common. This species is always plentiful near the coast but rare in the interior.

Guppya gundlachi Pfr. Specimens were identified as this by Rev. E. Lehnert.

Zonites (Hyalina) arboreus Say. Common.

Zonites (Hyalina) indentatus Say. Common.

Zonites (Hyalina) minusculus Binn. Not common.

Zonites (Hyalina) milium Morse. Found associated with *Pupa pentodon* Say.

Patula caeca Guppy.

Patula (Helicodiscus) lineata Say. Common.

Helix (Mesodon) jejuna Say. Common.

Helix (Triodopsis) hopetonensis Shutt. Not common.

Helix (Polygyra) auriculata Say. Not common.

Helix (Polygyra) pustula Fer. Common near Matanzas.

Helix (Polygyra) cereolus Mühlf. Common.

Helix (Polygyra) cereolus var. microdonta Desh. Common. It is the form called *H. carpenteriana* Bland.

Helix (Polygyra) cereolus var. septemvolva Say. The large specimens mentioned by Mr. Binney are common on the walls of Fort Marion. This species varies so greatly that the separation of varieties is merely a matter of selection and intermediate forms remain which connect them together.

Helix (Strobila) hubbardi A. D. Brown. This species is common on the trunks and limbs of orange trees in some parts of the city.

Bulimulus dormani W. G. Binney. A few specimens found in Cowan Swamp.

Pupa fallax Say. Common.

Pupa pentodon Say. Not common.

Pupa hordeacella Pilsbry. Common.

Strophia microstoma Pfr. One specimen among the debris on the beach.

Strophia sp.? This and the above probably floated from the Bahamas.

Succinea campestris Say. Common.

Succinea aurea Lea. Common on Anastasia Island.

Succinea obliqua Say. Not common.

Succinea luteola Gould. Not common.

Carychium exiguum. Common.

Melampus lineatus Say. (*M. bidentatus* Say.) Common.

Melampus flavus Gmel. Not common.

Limnæa humilis Say. Common in fresh water ponds on Anastasia Island.

Physa pomilia Conr. Common with the above species.

Physa heterostropha Say. Some young specimens evidently this species, from Tocoï St. John's River.

Planorbis tumidus Pfr. Common in ponds on Anastasia Island.

Planorbis dilatatus Gld. A few specimens near St. Mark's pond.

Ancylus (Aeroloxus) filus Conr. Common in a swamp near Matanzas.

Ancylus sp.? At Tocoï on the St. John's River.

Siphonaria lineolata d'Orb. Common on the old light house rocks.

HELIX HORTENSIS IN AMERICA.

BY T. D. A. COCKERELL.

There seems to be a prevalent opinion that this species does not belong to America at all, but was introduced, like *H. nemoralis*. This idea, however, is surely without foundation, and Mr. W. G. Binney tells me that he regards the species as naturally present in America. The distribution, though, is curious, and half suggests the idea (which I believe is without reasonable foundation) that the hardy Norsemen of old may have carried the snail about for food, and so imported it where they went. At all events, it frequents the places they visited. Starting with New England, the species goes north to Canada, Labrador and Greenland. It appears also in Iceland, and a small variety occurs in the Shetland Is.,¹ and so we come to the continent of Europe, where it abounds.

H. hortensis is readily known from *H. nemoralis*, when ordinary characters fail, by the shape of its "dart." It is also less variable than *nemoralis*. I have examined specimens of the following varieties, collected in America:—

(1.) *Helix hortensis* var. *vallotia* Moq.

There is an example of this variety from Labrador in the British Museum.

¹ The Shetland form was first named var. *nana*, but not described. It is now known as var. *minor* Jeffreys.

- (2.) *H. hortensis* var. *pallida* Ckll.

Magnolia, Mass. This variety is *pale* purplish or purplish-brown, without bands.

- (3.) *H. hortensis* var. *quinquevittata* Moq.

Magnolia. This is yellow with five bands.

- (4.) *H. hortensis* var. *rufozonata* Ckll.

Magnolia. Three specimens. Straw colored with red-brown bands, five in number.

- (5.) *H. hortensis* var. *subalbida* Locard.

Magnolia. Very pale yellow, or whitish, bandless.

- (6.) *H. hortensis* var. *lutea* Moq.

Magnolia. Pale yellow and bandless. This specimen belongs also to *hybrida* Jeffreys, because it has the lip of the shell tinged pale brown. This variety, combining the characters mentioned, may accordingly be written var. *lutea-hybrida*.

- (7.) *H. hortensis* var. *subglobosa*. (Binney.)

Shell greenish or brownish-yellow or honey-color. Parietal wall pale yellow, sharply defined from the darker (external) part of shell. Outer wall within white. This example, from Magnolia, is rather larger than the others, max. diam. $22\frac{1}{2}$ mill. This interesting variety is the *H. subglobosa* of Binney.

The varieties above enumerated from Magnolia, Mass., were sent to me by Mr. J. A. Singley, who obtained them from E. W. Roper. They were marked "introduced."

All the above varieties are known in Europe except *subglobosa*. Vars. *vallotia*, *quinquevittata*, *subalbida* and *lutea* were described from France originally, while *pallida* and *rufozonata* were first described from England.

Mr. F. R. Latchford informs me that the examples he has of *H. hortensis*, collected by Prof. Macoun on Anticosti Island, are some plain yellow, and others with five brown bands. These will belong to *lutea* and *quinquevittata* respectively.

West Cliff, Custer Co., Colorado, Jan. 28, 1890.

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

For some time past the formation of an American Association of Conchologists has been spoken of, among some members of the

Philadelphia Academy of Natural Sciences and others. The need of some such organization to systematize the work now being performed by many specialists in different parts of America, is almost self-evident; and, as everything must have a beginning, a meeting took place in Philadelphia upon April 2, 1890, at the office of Mr. John H. Campbell, the originator of the idea, and the "American Association of Conchologists" was the result. A president and a secretary were selected, in order to carry into effect the purpose of the Association and the first annual election of officers was fixed for the first Wednesday of June next, so as to enable all new members enrolled before that time, to take part therein.

As it would be impossible to hold regular meetings, of members residing at so many widely scattered points, no provision is made therefor. At some future time, if the Association becomes large enough, the members may determine to hold a Convention. No dues or charges are attached to membership, as there will be practically no expenses connected with the Association, beyond postage stamps and stationery. If such expenses, become very great, the members can provide for them in the future, by a small annual charge, but for the present it will be unnecessary. It is desirable also that students and young collectors should not be deterred from joining the Association by reason of expenses attached to the membership.

Each member is required by the rules (which are given below), to choose some special subject for study. This was considered by the meeting to be the most important part of the rules. By concentrating the attention of a member upon some particular branch of conchology or some special family or division of the Mollusca, he will be enabled to accomplish better results, even if he be a collector only, than he will if he attempt to cover the whole range of subjects. Hence even a beginner is required to make a selection. Members can afterwards widen the range of their studies, as they progress in knowledge.

Each member is urged to make a special collection of shells, etc., within his particular department, and is required, so far as his department goes, to aid the other members in naming shells, determining questions, etc. For instance, if a member desires to make an inquiry about North American Land and Fresh Water Shells, he will write to a specialist on that subject; if about South American,

Shells, he will write to Mr. Johnson, etc., etc. In this way, with a widely extended list of members, no one may be at a loss to find a solution to problems, which distance from Museums or difficulty in consulting books, ordinarily puts it out of his power to obtain. By joining the Association, a member is received into a brotherhood of scientists, ready and willing to help him in his studies. Joining forces in this way, must eventually be of benefit to Conchological Science.

Below will be found the names and addresses of the members of the Association, together with the list of subjects chosen. An invitation is extended to all American students and collectors to enroll themselves in the Association. All applications for membership should be made to Mr. Charles W. Johnson, Secretary, Wagner Institute, Philadelphia.

LIST OF MEMBERS.

John H. Campbell, President, 740 Sansom Street, Philadelphia.
Cypræidae.

Charles W. Johnson, Secretary, Wagner Institute, Philadelphia.
South American Mollusca.

Charles T. Simpson, Smithsonian Institute, Washington, D. C.
Geographical Distribution and Nomenclature.

H. A. Pilsbry, Academy Natural Sciences, Philadelphia. *Land and Fresh Water Shells generally.*

Rev. A. Dean, Muncy, Pa. *Fusidae.*

John Ford, 2602 Brown Street, Philadelphia. *Olividae.*

Uselma C. Smith, 707 Walnut Street, Philadelphia. *Conidae.*

John Shallcross, 627 Walnut Street, Philadelphia. *Valutidae.*

F. C. Baker. Academy Natural Sciences, Philadelphia. *Muricidae.*

Wm. J. McGinty, 2103 Vine Street, Philadelphia. *Marginellidae.*

Theodore G. Brinton, 755 Corinthian Avenue, Philadelphia.
Mitridae.

Joseph Willcox, 1810 Chestnut Street, Philadelphia. *Genus Fulgur.*

S. Raymond Roberts, Glen Ridge, N. J. *Cypræidae.*

[Thirteen new members (including Mr. Wm. H. Dall) have been added since printing the above lists. Their names will appear in next number of the Nautilus.—J. H. C.]

Rules of the Association.

1. The name of this association shall be the "American Association of Conchologists."

2. Its object shall be to enlist its members in the systematic study of the Mollusca, so that by harmonious co-operation better results may be accomplished for science.

3. There shall be no dues or charges attached to membership.

4. The officers shall be a President, vice-President and Secretary, who shall be chosen annually upon the first Wednesday of June. Upon that day each member shall send a communication to the Secretary, designating his choice for officers, and the person receiving the highest number of votes for each position shall be declared elected and shall assume office upon the 15th of June following.

5. The officers shall constitute a committee on membership. An applicant must be proposed to the Secretary, and upon a unanimous recommendation of the committee shall be enrolled as a member of the association.

6. As soon as possible after enrollment, each member shall select for special study some group, family or division of Mollusca, or some special branch of Conchology, and inform the President of his selection.

7. Members shall aid each other in naming shells, determining species, settling disputed questions, etc.

8. They shall also, whenever possible, make special collections of shells, etc. They are recommended also to make general collections, representing the leading genera and forms, both recent and fossil.

Young Collectors' Department.

LEAVES FROM A DIARY.

BY M. BURTON WILLIAMSON.

"We had thought the cliff at White's Point, Los Angeles County, hard to descend, but, when we saw the precipitous trail down which we were to pass at Point Fermin, we almost held our

breath! After a while, C. and J. being in advance, they called to E. and I that the trail was not so bad after all. We slid down, or, jumped down, as loose dirt or stones were under our feet, and, sooner than we hoped for, we were on the rocky beach below. Almost at the top of the cliff I had found, in the sandy rock, the *Aemæa patina*; and the first shell I found on the wet rocks, was a live *Aemæa patina*, Esch.! On a great mossy bed of solid stone about 40 feet square I found the *Conus Californicus*, Hds. so thick, I was reminded of wild strawberry picking in my younger days. The *Conus* in almost every instance was partly hidden in the wet moss. Near this mossy carpet three *Cypræa* (*Luponia*) *spadicea*, Gray, were found by C. and J. If the collecting of the *Conus* reminded me of picking strawberries, the *Luponia* in his shell with his red mantle dotted with bright yellow dots, was a huge strawberry himself! From under him rose his thin mantle until it almost covered his glossy shell. The shell shaded brown and drab, with a suggestion of the blue of the sky between the two colors, the transparent mantle, so gaily dotted with yellow, rising up over the brightly colored shell until it nearly met above in a frilled border, was a sight all five of us stood around and gazed at in wonder and admiration! Our delight found expression, then slowly the mantle was drawn down and out of sight."

PUBLICATIONS RECEIVED.

PROCEEDINGS OF THE IOWA ACADEMY OF SCIENCES, for 1887-1889, contains a history of the organization, and the following Conchological papers: Notes on the gross anatomy of *Campeloma*; on a new fossil Linnæid; The parvus group of Unionidæ, by R. E. Call. There are also a number of papers on geology, botany and entomology by various authors. From R. E. Call.

REPORT ON THE ANIMALS OF THE WATERS OF THE MISSISSIPPI BOTTOM NEAR QUINCY, ILL., by H. Garman, Zool. Assist. Ill. State Lab. Nat. Hist. In a series of papers of which this is the first, it is purposed to set forth in a general way an exhibit of the animal life of the Waters of Illinois as related to fish-culture primarily, but also and finally in relation to nature at large. The present pamphlet treats of all forms of animal life observed at Quincy, in August, 1888. A short list of mollusks, with notes, is given on pp. 23 to 27. From S. A. Forbes, Director Ill. State Lab. N. H.

THE NAUTILUS

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DEVOTED TO THE INTERESTS OF
CONCHOLOGISTS.



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HISTORY OF THE NAUTILUS.

In answer to numerous inquiries, it has been deemed advisable to give a brief historical sketch of THE NAUTILUS and its predecessor *The Conchologists' Exchange*.

The present conchological periodical "THE NAUTILUS" was preceded by "*The Conchologists' Exchange*," a monthly published by Mr. Wm. D. Averell. The first number of the *Exchange* was printed on a postal card in July, 1886. Beginning with August, 1886 the *Exchange* was printed in 12 mo. form, $5\frac{1}{2} \times 6\frac{1}{2}$ inches, with a varying number of pages. Eleven numbers (Nos. 9 and 10 being printed together as a "double number") were issued of this first volume. The second volume began with July, 1887. Nine numbers were issued, when publication was suspended.

In May, 1889, Mr. H. A. Pilsbry with Mr. Averell issued the first number of THE NAUTILUS. The new periodical assuming the unexpired subscriptions on the list of the "*Exchange*." At the completion of volume I (including May, 1889 to April, 1890), Mr. Chas. W. Johnson purchased Mr. Averell's interest in THE NAUTILUS, Mr. Averell entirely severing his connection with it.

The present publishers of THE NAUTILUS are unable to furnish copies of "*The Conchologists' Exchange*."

H. A. P. & C. W. J.

THE NAUTILUS.

VOL. IV.

MAY, 1890.

No. 1.

EDITORIAL.

With this number of the NAUTILUS we call the attention of our subscribers to a change in the proprietorship of the journal; Mr. Averell, heretofore its business manager, having retired, and entirely withdrawn his interest in the paper.

The editor has now associated with him, Mr. CHARLES W. JOHNSON, acting curator of the Wagner Free Institute of Science, Philadelphia. To the majority of American conchologists Mr. Johnson needs no introduction. It is a pleasure to the editor to be able to announce that he has secured the coöperation of so efficient a colleague.

All communications of a business nature should be addressed to Mr. Johnson. Contributions to the pages of the NAUTILUS may be sent to either Mr. Johnson or to the Editor, at the addresses given on the title-page.

After the first two numbers, the NAUTILUS will be issued *on the first of each month*. It is our intention to insure the prompt receipt of each number by our subscribers.

It is the purpose of the proprietors to publish articles of interest to beginners in the study as well as to experienced conchologists. The next number will contain an illustrated paper of great interest on *Haliotis* by Prof. Josiah Keep; the continuation of Mr. Carpenter's valuable notes on Rhode Island shells; articles by Dr. Sterki, Mr. Hemphill, the Editor and others.

AN AMERICAN ANADENUS.

BY HENRY HEMPHILL.

Recently, on the Cuyamaca Mountains in San Diego County, California, I was fortunate in finding specimens of what proved to be a genus new to America. Submitting them to Mr. Binney and Mr. Cockerell, they agreed with me in referring these species to *Anadenus*, formerly known of only from the Himalaya Mts.

The genus is characterized thus by Binney in his *Genera of Slugs*—"Animal limaciform, subcylindrical, tapering behind; tentacles simple; mantle anterior, concealing an internal shell-plate; no longitudinal furrows above the margin of the foot, and no caudal mucus pore; a distinct locomotive disk; external respiratory and anal orifices on the right posterior margin of the mantle; orifice of combined genital system behind and below the right eye peduncle.

Internal shell-plate small, oval, flat, with posterior nucleus and concentric striae.

Jaw with numerous ribs.

Lingual membrane with tricuspid centrals, bicuspid laterals and quadrate marginals."

The genus differs from *Prophysaon* by its posterior respiratory orifice, the position of the genital orifice and by its locomotive disk. It will, however, be remembered that Fischer considers *Prophysaon* a subgenus of *Anadenus*. The distinction between the two is slight, especially as regards the respiratory orifice. The living slugs found by me had it slightly posterior. In alcoholic specimens of this and many of the *Prophysaons* it is difficult to detect its true position, so nearly subcentral is it.

ANADENUS COCKERELLI, n. sp.

Length contracted in alcohol $13\frac{1}{2}$ mill. Mantle $4\frac{1}{2}$ long, $2\frac{3}{4}$ wide. End of mantle to end of body 8. Foot 2 wide. Foot with a locomotive disk, being distinctly differentiated into median and lateral tracts. Respiratory orifice slightly posterior, on right edge of mantle. Genital orifice below right tentacle. No caudal mucus pore. Locomotive disk narrow, only half the width of the lateral areas. Sides of foot wrinkled, but not differentiated from lateral areas, nor specially marked, the wrinkles being a continuation of the transverse grooves of the lateral areas. Mantle tuberculate rugose, oval in outline, bluntly rounded at either end, not grooved as in *Amalia*. Man-

tle free in front as far as respiratory orifice. Back rather bluntly keeled its whole length; rugæ rather flattened and obtuse, consisting of grooves inclosing mostly hexagonal lozenge-shaped spaces, which are themselves rugose. Color, uniform brown-black without markings, except some dark marbling on the lighter sides. The portion beneath and in front of the mantle is pale, and the head and neck have a gray tinge. Foot brown. Internal shell solid, easily extricated without breaking.

Cuyamaca Mountains, San Diego Co., California.

Jaw low, wide, slightly arcuate, ends blunt, anterior surface with about twenty wide, flat ribs, squarely denticulating either margin.

Lingual membrane short and narrow. Teeth 20-1-20, of which eight only on either side are laterals. Centrals tricuspid, laterals bicuspid, marginals quadrate, bluntly bicuspid.

I am indebted to Mr. Binney and Mr. Cockerell for assistance in preparing the above description.

TWO NEW SPECIES OF U. S. LAND SHELLS.

BY H. A. PILSBRY.

Zonites Shimekii Pilsbry. This is a larger form than *Zonites limatulus*, much less depressed. The specimens are from the *Loess* formation, at Iowa City, Iowa, collected by Prof. B. Shimek and the writer some years ago. Being fossil, they lack color and epidermis. The sculpture is similar to *Z. limatulus*.

Alt. 3, diam 6 mill.

Pupa syngenes Pilsbry. Shell subcylindrical but wider above, composed of 8 narrow, convex whorls, *sinistrally convoluted*; texture as in *P. muscorum*, but color rather lighter brown. Last whorl ascending, imperforate, bearing a strong high crest just behind the outer lip. Aperture shaped as in *muscorum*, having a single small parietal denticle. Alt. $3\frac{3}{4}$, diam. $1\frac{1}{2}$ mill.

Two specimens of this form are before me, and I am in doubt whether to give them a new name, as they may be only sinistral monstrosities of the common *P. muscorum*. The shells are labeled "*Arizona*" in the Academy collection, collector not known.

[Since the above paragraphs were in type, I have received a communication from my friend Dr. V. Sterki, to whom I sent a speci-

men of *P. syngenes*, which I at first described as a variety of *muscorum*. He says:

"I am satisfied that it is a species, and not a var. of *muscorum*: the shape of the whole shell, the last whorl so considerably flattened, and ascending, the number of whorls, seem to me to prove its specific rank. *** After washing out the aperture of your specimen I saw a rather strong lamella or tooth on the columella, and a barely perceptible trace of an inter-palatal lamella, which however is validified by the impression on the outside."]

ANNOTATED LIST OF THE SHELLS OF ST. AUGUSTINE, FLA.

BY C. W. JOHNSON.

Teredo nivalis L.

Pholas campechiensis Gmel. Single valves are common on the ocean beach but living examples are rarely found.

Pholas costata L. Common.

Pholas truncata Say. A few specimens in the hard mud on Anastasia Island.

Martesia cuneiformis Say. Common burrowing into coquina wood, etc.

Solen americana Gould. Not common and smaller than those from more northern localities.

Solen viridis Say. A few specimens.

Glycimeris reflexa Say. One specimen with both valves intact was found on a bar in the harbor.

Glycimeris americana Conr. (*G. bitruncata* Conr.) Single valves are occasionally found on the ocean beach—apparently recent.

Mya arenaria L. A few single valves.

Corbula contracta Say. Common.

Mactra solidissima Dillw. var. *similis* Say. Common.

Mactra lateralis Say. Common.

Mactra braziliana Lam. (*M. oblonga* Say.) Not common.

Labiosa lineata Say. A few single valves on the ocean beach.

Labiosa canaliculata Say. Common.

Semele orbiculata Say. Common.

Abra aequalis Say. Common.

Cumingia tellinoides Conr. Not common.

Tagelus gibbus Spengl. Common.

Tagelus devisus Spengl. Common.

Tellina alternata Say. Common.

Tellina polita Say. Common.

Tellina tenera Say. Common on the bar below the United States Barracks.

Tellina braziliensis Lam. A few single valves.

Macoma tenta Say. Not common.

Macoma constricta Brug. A few single valves.

Donax variabilis Say. Common.

Donax obesa d'Orb. Common at the mouth of the Lagoon.

Petricola pholadtiiformis Lam. Common.

Petricola typicus Jonas. One specimen from a coquina rock at Matanzas Inlet.

Venus mercenaria L. Common.

Venus cancellata L. A few single valves.

Callista gigantea Gmel. Not common.

Dosinia discus Reeve. Common.

Cyrena carolinensis Bosc. Common in small brackish-water streams.

Sphaerium partiumum Say. Common in Moultrie Creek.

Sphaerium contractum Prime. A few near St. Mark's pond.

Cardium magnum Born. Common.

Cardium muricatum L. Not common.

Levicardium serratum L. Rare.

Chama arcinella L. A few single valves.

Chama macrophylla. Not common.

Lucina dentata Wood. Common.

Lucina crenulata Conr. Not common.

Loripes edentula L. Large single valves are quite common but living examples are rare.

Solemya velum Say. Two specimens.

Parastarte triquetra Say. Not common.

Cardita tridentata Say. Not common.

Unio blandingianus Lea. Common in Cowan's Swamp. This is one of the Florida species that is able to survive a long time out of water.

Unio fuscatus Lea. Common in the upper part of Moultrie Creek.

Unio nigrinus Lea. Common in tributaries of the St. John's River west of St. Augustine.

- Nucula proxima*. Common.
Arca incongrua Say. Common.
Arca transversa Say. Common.
Arca pexata Say. Common.
Arca americana Gray. Common.
Arca ponderosa Say. Common.
Pectunculus sp.? Single valve.
Mytilus exustus L. Common.
Mytilus hamatus Say. Common.
Modiola tulipa L. A few small specimens.
Modiola plicatula Lam. Common.
Modiola lignea Reeve. Two specimens attached to Gorgonia.
Dreissensia leucophaea Conr. Common in brackish water.
Lithophagus appendiculata L. Common burrowing into Coquina.
Avicula atlantica Lam. Three specimens.
Avicula radiata Lam. One specimen attached to floating seaweed.
Pinna seminuda Lam. Common.
Pinna muricata L. Common.
Plicatula ramosa Lam. A few young specimens attached to coral.
Lima tenera Chemn. One living specimen.
Pecten dislocata Say. Living examples are rarely found.
Anomia ephippium L. Common.
Ostrea virginica Gmel.
Ostrea equestris Say.
Ostrea frons L. One specimen attached to Gorgonia.
Glottidia antillarum var. *pyramidata* Stimp (*Lingula*). A specimen taken near the old light-house is in a private collection.

WHY DOES PROPHYSAON SHED ITS TAIL?

BY W. J. RAYMOND.

While reading the March "Nautilus" my attention was directed to the foot-note on page 126, in which is related Mr. Hemphill's extraordinary experience with a specimen of Prophysaon. I have twice had a similar experience while handling living animals of the same genus, and think it may be of interest to record my observations.

In August, 1888, I collected on one occasion about a dozen examples of *Prophysaon andersoni* J. G. Cp., near the San José reservoir, above Lexington, Santa Clara County. While taking measurements of the living specimens, before putting them into alcohol, I noticed in several a contraction about two-thirds of the length from the head. This appeared as an indented line completely encircling the body. Upon handling the slugs to examine this phenomenon more closely, the line became deeper and in the case of two of the specimens the tail dropped off, almost as readily as the ray of the so-called "brittle" starfish. Only with mature slugs did this happen. The young, constituting the majority of those captured, showed no signs of shedding their tails. Perhaps they had further use for them. The discarded appendages showed vitality for a short time only, when they went to join their owners in my collecting bottle.

Again, only a few weeks ago, I collected on the northern boundary of Oakland some *Prophysaon hemphilli* Bl. & Binn. which together with *Ariolimax Californicus* and one of our smaller species of *Ariolimax*, inhabit a marshy spot near the Bay shore. At home the next day when taking my captives out of the can into which they had been put, I noticed the same contraction taking place in the specimens of *Prophysaon*, but in no case did it proceed to dismemberment. I put them into alcohol and in every one of them, seven in all, there is a well-marked, depressed line about the body near the tail, the body being attenuated behind the constriction, the whole looking very much as a soft iron wire looks just before it breaks under a tensile strain. In the largest specimen which measures 34 mm. contracted in alcohol, the depressed line is 8 mm. from the tail and is marked across the foot by a black line, as if the tissues were already almost severed. When collected there was no constriction visible.

In no other case have I observed this dropping of the tail among slugs, which seems as far as recorded to be confined to species of the genus *Prophysaon*. Here are the facts; who can explain them?

NOTES ON SOME NORTH AMERICAN PUPIDÆ WITH DESCRIPTIONS
OF NEW SPECIES.

BY DR. V. STERKI.

On my request, Mr. H. Hemphill, of San Diego, Cal., was so kind as to forward to me, for examination, all the North American

Pupidae in his possession. Among them there are a number of very interesting forms and varieties, as well as some species new to our fauna.

Pupa californica, Rowell.¹

From Mr. Hemphill's material we learn that this species is variable to a very exceptional degree, so that the extreme forms appear to be, or to belong to, quite different species, or even genera. And it is more than probable that new specimens from other places will bring to light still more forms. The lots under consideration are the following:

1. *From San Francisco.* Several hundred examples of the well known form everywhere in collections. It may be regarded as typical, yet is somewhat variable in itself, as to shape of the shell and number and size of the lamellæ; many specimens are more or less oblong or obovate, while the majority are rather cylindrical; in some, the superior palatal lamella is very small and in a few even entirely wanting, while the apertural, columellar and inferior palatal seem to be constant, the first and last of them generally well formed, while the columellar may be small. In one specimen I saw a tiny but distinct supra-apertural, and in very many there is a small, nodule-like supra-apertural, close to the middle of the (outer side of the) apertural. So far I had thought this latter to be a special, distinguishing character of *P. rowelli*, Newc.

2. *From San Clemente Isl.* A little smaller and generally more cylindrical than the type; a part are even long cylindrical, having the appearance of an *Isthmia*. The coloration is somewhat paler, and the lamellæ are well formed—*elongata*. Among the more than 100 specimens there were 5 different from the balance, and ranging with the following form.

3. *From Santa Catalina Isl.* All the examples (about 200) are of quite a peculiar form: small, rather short, pale horn colored; shell thin, delicate; rib-like striae less numerous and relatively larger; the whorls are less high, which gives the shell a different appearance. All lamellæ are present and well formed, especially the apertural. The shell is nearly exactly of the size and shape of

¹ Although I had ranged this species, with *corpulenta*, etc., among *Vertigo*, I prefer here leaving it once in the old place, on account of the varieties being so different from what we consider to be true *Vertigo*.

Vertigo bollesiana Morse, from New York or Ohio,¹ and also the lamellæ are much alike. One peculiarity is that in about one-third of the examples a part of the shell is wanting, always on the side of the aperture, so that 3 or even 4 whorls are opened. This can hardly be accidental, and probably that part of the thin shell is worn off by friction in moving. I would propose to name this form *var. catalinaria*; others might regard it as a species, as it appears to be rather well defined, and distinct from the other forms.

(*To be continued.*)

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

JUNE 4, 1890.

John H. Campbell, President, Philadelphia. *Cypracidae*.

Charles W. Johnson, Secretary, Philadelphia. *South American Mollusca*.

Frank C. Baker, Philadelphia, Pa. *Muricidae*.

Rev. W. M. Beauchamp, Baldwinsville, N. Y. *Land and Fresh Water Shells of North America*.

Theodore G. Brinton, Philadelphia, Pa. *Mitridae*.

J. J. Brown, M. D., Sheboygan, Wis.

F. C. Browne, Framingham, Mass. *Nassidae and Strophidae*.

H. F. Carpenter, Providence, R. I. *Shell-bearing Mollusca of Rhode Island*.

Prof. Wm. B. Clark, Baltimore, M. D. *Eocene Mollusca*.

Thomas C. Curry, Connersville, Ind. *Succineidae*.

Wm. H. Dall, Washington, D. C. *Abyssal Mollusks*.

Rev. A. Dean, Muncy, Pa. *Fusidae*.

Geo. W. Dean, Kent, Ohio. *Helicidae*.

James M. Delaney, Rochester, N. Y.

L. B. Elliott, Iowa City, Iowa. *Dentition*.

Frank J. Ford, Wichita, Kan. *Pupidae*.

John Ford, Philadelphia, Pa. *Olividae*.

T. Marshall Fry, Syracuse, N. Y. *Unionidae*.

Uly. S. Grant, Minneapolis, Minn. *Land and Fresh Water shells of North America*.

¹ The New York and Ohio specimens of *V. bollesiana* are larger and more distinctly striate than those from New England and Canada.

I. Greeger, Jacksonville, Florida. *Tritonidae*.

C. A. Hargrave, Danville, Ind. *Unionidae*.

Geo. W. Harper, Cincinnati, Ohio. *Land and Fresh Water shells of North America*.

Dr. W. D. Hartman, West Chester, Pa. *Partula, Achatinella and Helicina*.

A. A. Hinkley, Dubois, Ill. *Strepomatidae*.

Prof. Josiah Keep, Mills College, Cal. *West Coast Shells*.

Rev. A. B. Kendig, Brooklyn, N. Y. *Amphidromus*.

F. R. Latchford, Ottawa, Ont. *Linnaeidae of North America*.

M. L. Leach, M. D., Wexford, Mich. *Mollusks of Michigan*.

W. Victor Lehman, Tremont, Pa. *Unionidae*.

G. D. Lind, St. Louis, Mo. *Helicidae*.

G. W. Lichtenthaler, Bloomington, Ill. *West Coast Shells*.

Wm. A. Marsh, Aledo, Ill. *Unionidae*.

Geo. T. Marston, Green Bay, Wis. *Wisconsin Mollusca*.

Chas. J. Maynard, Newtonville, Mass. *Strophia*.

Wm. G. Mazyck, Charleston, S. C. *North American Land Shells*.

Thomas Morgan, Somerville, N. J.

James H. Morrison, Lexington, Va. *Specific Variation*.

Wm. J. McGinty, Philadelphia, Pa. *Marginellidae*.

Philip Nell, Philadelphia, Pa. *Unionidae*.

H. A. Pilsbry, Philadelphia, Pa. *Land and Fresh Water shells*.

Wm. J. Raymond, Oakland, Cal. *West Coast Land and Fresh Water Shells and Tertiary and Quaternary Shells*.

John Ritchie Jr., Boston, Mass. *Strombidae*.

S. Raymond Roberts, Glen Ridge, N. J. *Cypraeidae*.

Edward W. Roper, Revere, Mass. *Cyrenidae*.

John Shallcross, Philadelphia, Pa. *Volutidae*.

Prof. Benj. Sharp, Philadelphia, Pa. *Dentaliidae*.

Ida M. Shepherd, Long Branch, Cal. *West Coast Shells*.

Prof. B. Shimek, Lincoln, Neb. *Ancylus and Succineidae*.

Chas. T. Simpson, Washington, D. C. *Geographical Distribution and Nomenclature*.

J. A. Singley, Giddings, Tex. *Land Shells of North America*.

Sanderson Smith, New York, N. Y. *Mollusca of N. W. Atlantic*.

Uselma C. Smith, Philadelphia, Pa. *Conidae*.

Dr. V. Sterki, New Philadelphia, O. *No. Amer. Pupidae and Hyalinia*.

L. H. Streng, Grand Rapids, Mich.

W. S. Strode M. D., Bernadotte, Ill. *Unionidae of Illinois R. and tributaries.*

Geo. W. Taylor, Stewarton, Ottawa. *Mollusca of Vancouver Province and Patellidae.*

John H. Thomson, New Bedford, Mass. *Helicidae.*

Bryant Walker, Detroit, Mich. *Land and Fr. W. Shells of No. America.*

Rev. John Walton, Lakeside, N. Y. *Cypraeidae.*

Henry A. Ward, Rochester, N. Y. *General Conchology.*

W. W. Westgate, Houston, Tex. *Land and Fr. W. Shells.*

Mrs. A. M. Whelden, Campello, Mass.

Prof. R. P. Whitfield, New York, N. Y. *Fossil Forms of the Mollusca.*

Joseph Willcox, Philadelphia, Pa. *Fulgur.*

Mrs. M. Burton Williamson, University Cal. *Haliotidae and Fissurellidae.*

S. Hart Wright, Penn Yan, N. Y. *Unionidae.*

Lorenzo G. Yates, M. D., Santa Barbara, Cal. *Land Shells of the Americas, South of the U. S.*

All applications for membership should be addressed to the Secretary, Charles W. Johnson, Wagner Institute, Philadelphia, Pa. The Rules of the Association were printed in the last number of the NAUTILUS.

NOTES AND EXCHANGES.

THE ORIGIN OF SPECIES.—The botanist Ball believes that species are produced by the successive variations of individuals continued through generations, and the subsequent dying out of the intermediate forms. In a recent address he refers to the *Escallonias* in this manner: "There are an immense number of forms of this genus in Chili, which would make first-class species if only the intermediate links would hurry and get out of the way." Anybody who has examined the Hemphill series of the *Helix strigosa* group cannot fail to notice how admirably the theory applies to that shell. And I believe that groups hardly less extensive can be made of the forms of *Sphaerium striatinum*, *Unio complanatus*, the Michigan *Anodontas*

and other species. The American student of conchology has a broad field for work in his own country, and his researches will not be less valuable, if they result in a consolidation rather than an increase of species.—E. W. ROPER.

OFFERED.—North American Land and Fresh-water shells for shells from other localities.—THOS. C. CURRY, *Connersville, Indiana, P. O. Box 366.*

OFFERED.—Land and Fresh-water shells of Indiana for the same or marine species from any part of the world. *Unionide* preferred. Printed list of Hendricks County Shells sent free. Mounted lingual ribbons for microscopists.—CHAS. A. HARGRAVE, *President of Central Normal College, Danville, Indiana.*

LIMAX ARBORUM form SUBMACULATUS f. nov. Resembles var. *maculatus* Roeb., except that the spots are gray and partly coalesced on the body; and some black and some gray on the mantle. Found in County Waterford, Ireland, by Rev. A. H. Delap.—T. D. A. COCKERELL.

IDENTIFICATION OF SHELLS FOR SUBSCRIBERS.—Specimens of North and South American (including Mexican and West Indian) shells will be named *for subscribers* on the following conditions:

- 1st. The number of species in one sending to be limited to 12.
- 2nd. The sender to pay all expenses of transportation, and the specimens to become the property of the Philadelphia Academy of Sciences.

3rd. Each species must be numbered, so that the identifications may be announced *by number* in this department of the NAUTILUS.

Address packages to H. A. Pilsbry, Academy of Natural Sciences, Philadelphia, or to C. W. Johnson, Wagner Institute, Philadelphia.

HELIX INTROFERENS Bland has been collected by Mr. William Fox at Atco, N. J. (on the Camden and Atlantic R. R.). This species has not heretofore been noticed so far northward.—H. A. P.

MR. CHAS. W. JOHNSON, Junior Editor of the NAUTILUS, will spend the first half of June in Virginia, on a geological trip.

THE NAUTILUS.

VOL. IV.

JUNE, 1890.

No. 2.

THE HALIOTIS.

BY JOSIAH KEEP,

President Isaac Lea Chapter, Agassiz Association.

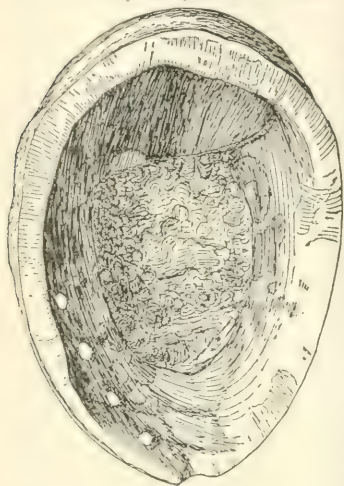
The Haliotis is the largest and finest Mollusk that is found on the coast of California. While its shell is a valuable article of commerce, its flesh is good for food, though perhaps few people except Chinese and Indians ever indulge in that luxury. I can speak from experience however, and am ready to affirm that "abalone soup," well made, is fit for the table of the most fastidious.

The Indians have nearly all disappeared from the coast now, but only a hundred years ago they were numerous enough, and for how many centuries before that time they had abounded in California is a question for the archaeologists. Certain it is that along the shores where these mollusks now live there are untold numbers of Haliotis shells in all stages of decomposition. They were not washed up by the waves either, for they lie on the banks above the reach of the ocean. Besides this, stone mortars and other relics of savage men are occasionally found with the old shells. Evidently the Indians were accustomed to gather the mollusks from their haunts on the rocks and use their flesh for food. After the savage repast was over they threw away the beautiful shells.

This work went on for centuries, and to-day the railroad cuttings along the coast expose to view banks of mingled earth and pearl, several feet in thickness. It makes a conchologist's heart ache to find bushels of what were once magnificent specimens now all in ruins, and to think how little they were prized by those who had such excellent opportunities for collecting. But we will not blame them, poor sons of the forest; at least they knew how to satisfy their

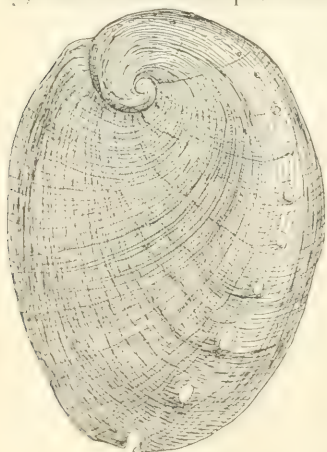
hunger in an approved manner, and sometimes they made ornaments from the discarded shells.

There are three species of *Haliotis* found in large numbers on the coast of California, though all three do not abound in the same locality. The southern species, *H. splendens*, is never found north of Monterey Bay, and I have seen only one specimen from that body of water. That one, however, was a genuine *splendens*, and I know almost the rock from which it was taken. I dissected the creature, which was evidently an aged individual, and the shell is now in my cabinet. This species is found abundantly farther south, around Santa Barbara and San Diego. It is really the most beautiful of the three, though its shell is too thin for some kinds of work. The magnificently mottled green pearl of the great muscle scar reminds one of the full glory of a peacock's expanded tail.



H. splendens.

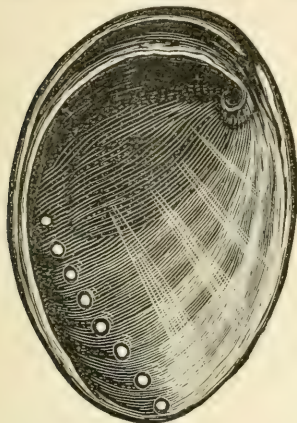
On the shores of central and northern California the other two species abound. *H. rufescens* sometimes has a shell as large as a dinner plate, but common specimens are only six or eight inches long. The outer layer of the shell is of a red color, while the inner or nacreous portion is beautifully iridescent. On account of their solidity, the shells of this species are specially fitted for making jewelry and pearl ornaments. These mollusks are captured by Chinese boatmen, who row along near the rocks, when the tide is low, and peer curiously down into all the cracks and clefts where these great creatures hide. When one is discovered, a wedge on the end of a pole is employed to suddenly dislodge the poor mollusk from his strong hold, and a boat-hook draws him up from the water into the hands of his enemy.



H. rufescens.

The third species, *H. Cracherodii* is the most common of all and is also the smallest, though it some-

times assumes noble proportions. You can find them under stones or in out-of-the-way places among the rocks if you search when the tide is low. All of these mollusks, in fact, are rock lovers, and it is idle to seek for them except among the crags or broken boulders. It is exceedingly interesting to capture a good-sized fellow and watch his mode of locomotion. When placed on a smooth rock he moves



H. Cracherodii.

along at no snail's pace, but strides on like an elephant. Not quite so fast, to be sure, but the motion of his body, slightly swaying from side to side, and the tremendous muscular force which he evidently exerts cause one to involuntarily compare his gait to that of the great proboscidian. And as for that matter, our mollusk also has a thick, black proboscis, of no mean proportions.

The Haliotis, in short, is the noblest mollusk of our coast, if not of America. Of prodigious muscular power, quick and active in movement, guided by keen instincts, supplying nourishing food to man, and above all yielding a shell beautiful as the rainbow, it deserves an honorable place in the list of our important genera.

Very fine green pearls, almost rivaling the product of the pearl-oyster are sometimes taken from its mantle, and when its superior organization is considered, it is certainly far in advance of its headless neighbor. Every young collector should be sure to get good specimens of California "abalone" shells and those who are fortunate enough to visit the haunts of these creatures should endeavor to learn more of their habits, and observe their curious structure and interesting movements.

NEW VARIETIES OF *PATULA STRIGOSA*.

BY HENRY HEMPHILL.

Patula strigosa var. *carnea*.

Shell umbilicated, greatly depressed, dark horn-color, rather solid, shining, surface somewhat uneven and covered with irregular

oblique striae; whorls $5\frac{1}{2}$, convex, the last faintly subcarinated in the depressed specimens, falling in front, sometimes faintly banded, but most of the specimens are plain and without bands; spire subconical, apex obtuse, suture well impressed, umbilicus large; aperture circular: lip simple, thickened, its terminations well approached and joined by a callus.

Height $\frac{5}{8}$ inch, greater diam $\frac{7}{8}$, lesser $\frac{3}{4}$ inch. Habitat, near Salt Lake, Utah.

***Patula strigosa* var. *picta*.**

Shell umbilicated, elevated or globosely depressed, of a dirty white color, stained more or less with chestnut; surface somewhat rough and uneven, covered with moderately coarse oblique striae and fine revolving lines; whorls 6, convex, subcarinated, with a broad white band at the periphery and a dark zone of chestnut on the upper side, extending from the peripheral band to the suture, fading out as it traverses the whorls of the spire; beneath on the base of the shell it is striped with numerous bands that sometimes extend into the umbilicus and also into the aperture; spire elevated; apex obtuse, suture well impressed, umbilicus moderately large and deep, broader in the depressed than in the elevated forms; aperture nearly circular, lip simple, subreflected, its terminations approaching and joined by a thin callus.

Height $\frac{7}{8}$ inch, greatest diam. $1\frac{1}{8}$ inch, lesser 1 inch.

Habitat, Rathdrum, Idaho.

***Patula strigosa* var. *rugosa*.**

Shell umbilicated, elevated or globosely depressed, of a dull brown ash color; surface rough, covered with coarse irregular oblique striae, and microscopic revolving lines; whorls 5, convex, with or without one or two narrow faint revolving bands. In most of the specimens the bands are obsolete; spire elevated, obtusely conical; suture well impressed; umbilicus large, deep; aperture nearly round, lip simple, thickened, its terminations approaching and joined by a thin callus.

Height of the largest specimen $\frac{3}{4}$ inch, greatest diam. 1 inch.

Height of the smallest specimen $\frac{1}{2}$ inch, greatest diam. $\frac{3}{4}$ inch.

Habitat, New Brigham City, Utah.

A large rough robust form with very convex whorls; some of the specimens so closely resemble *H. solitaria* Say, that one not well acquainted with both forms would be easily deceived and refer it to that species. In its adolescent state the lip is very thin or easily

broken, and on the surface of the adult shells these fractures give it a rough and uneven appearance.

***Patula strigosa* var. *parma*.**

Shell broadly umbilicated, greatly depressed, of a dark dirty horn color, surface somewhat rough, covered with coarse irregular striae, and microscopic revolving lines; whorls $5\frac{1}{2}$ or 6, subcarinated throughout, somewhat flattened above, rounded beneath, and striped with two chestnut-colored bands, one above and the other just at the periphery; spire very little elevated, umbilicus moderately large and deep; aperture ovately round, oblique; lip simple, subreflected, its terminations approaching and joined by a thin callus.

Height $\frac{1}{2}$ inch, breadth 1 inch.

Habitat near Spokane Falls, Washington.

***Patula strigosa* var. *hybrida*.**

Shell umbilicated, depressed, white, spire horn-color, surface of the shell covered with fine oblique striae, and widely separated revolving raised lines; whorls 5, flattened above, rounded beneath, the last falling in front, and striped with two faint chestnut bands, suture well impressed; umbilicus large, showing nearly all the volutions; aperture nearly circular; lip simple, thickened, its terminations approaching and joined by a thin callus.

Height $\frac{3}{4}$ inch, diam. $\frac{3}{4}$ inch, lesser $\frac{5}{8}$ inch.

Habitat near Logan, Utah.

This is an interesting shell as it is the beginning of the forms of *strigosa* that finally develop the revolving lines into prominent ribs as seen on the surface of var. *Haydenii* Gabb.

***Patula strigosa* var. *albida*.**

Shell broadly umbilicated, greatly depressed, white, tinged with horn color; surface covered with fine oblique striae and fine microscopic revolving lines; whorls 6, convex, the last falling in front; spire very little elevated, apex obtuse, aperture oblique, nearly round; lip simple, thickened, subreflected at the columella, its terminations approaching, joined by a thin callus.

Height $\frac{1}{2}$ inch, greatest diam. 1 inch, lesser $\frac{3}{4}$ inch.

Habitat near Logan, Utah.

***Patula strigosa* var. *fragilis*.**

Shell umbilicated, elevated or globosely depressed, translucent, thin, fragile, somewhat shining, of a dark horn color, surface covered by fine oblique striae; whorls 5, convex, the last descending in front, and

striped by two dark chestnut bands, one above and the other below the periphery; suture well impressed; aperture oblique; lip simple, thickened, umbilicus moderate, deep, partially covered by the reflected lip at the columella.

Height of the largest specimen $\frac{9}{16}$ inch, greatest diam. $\frac{1}{2}$ inch, lesser $\frac{3}{4}$ inch.

Habitat near Franklin, Idaho, among Red Sandstone.

A very thin and almost transparent variety of the very variable *strigosa*. By its peculiar shade, it is very evident that the animal has drawn largely from the red sandstone for the material to build its shell.

NEW FORMS OF AMERICAN PUPIDÆ.

BY DR. V. STERKI.

Pupa Californica, varieties, continued.

4. *From Monterey, Cal.* In size not much different from the type, yet a little smaller, and more generally obovate; the striae are less coarse; the peristome is slightly but distinctly expanded. There is no superior palatal lamella, and the three present ones are small, the columellar even a trace or wanting entirely. The form may be named: *var. trinotata*.

5. *From San Diego, Cal.* The diminution of the lamellæ is going on; none but the apertural is left in this variety—*diegoensis*—and that even is quite small or a mere trace. In size and shape, the examples are not much different from the Monterey form, which is an intermediate one. In the relation of *var. diegoensis* and the very distinct *var. catalinaria*, and also *elongata* on the neighboring islands, there is a zoogeographical enigma, which may be solved in connection with other facts.

6. *From Rocklin, Cal.* (Placer Co. 25 Ms. N. E. of Sacramento.) Large, conic or ovate conic, or turriculate, umbilicated, rib-like striae rather strong; whorls 5, well rounded, with deep suture, the last occupying more than $\frac{1}{2}$ altit.; aperture subovate or nearly circular, margins much approximate and the ends protracted, peristome shortly but decidedly expanded; lamella one, apertural, small. Alt. 2, 5; diam. 1, 5 mill. For its size, rounded aperture and single lamella I would name this form *var. cyclops*. It is with some doubt

that I refer this form to *P. californica*: it might just as well be regarded as a distinct species. But for that there will be time if no intermediate and connecting forms be found.

It will be of special interest to examine and compare the soft parts of all these varieties or forms, anatomically as well as to the mode of life.

Some conchologists may consider it to be useless or even worse to apply varietal names to the forms described above; but we must try to arrange them systematically as naturally as possible, according to their relations among themselves and with kindred species; and for that purpose we must name them. And it is also for convenience; is it easier to say, in citing: "*that variety of P. californica inhabiting Santa Catalina and San Clemente Islands, much smaller than the type, with lower whorls, lighter coloration, relatively coarser striation, and well formed lamellæ*," than simply designating it by a name?

Fupa Dalliana sp. nov.

Shell conic or ovate-conic, of greenish-horn color, transparent, finely irregularly striate in the lines of growth, polished; whorls $4\frac{1}{2}$, well rounded, with deep suture, rather rapidly increasing, the last occupying about $\frac{3}{4}$ of altit., towards the aperture somewhat ascending on the penultimate. Aperture lateral, somewhat oblique, subovate with just perceptibly flattened palatal margin; margins approximate, the ends protracted; peristome shortly but decidedly expanded, with a very fine thread-like lip near the margin, the same continuing as a very fine callus on the apertural wall inside of the line connecting the ends of the margins; palatal wall quite simple; no lamellæ.

Alt. 1. 2; diam. 1. 3 mill.

This form has been collected by Mr. Hemphill near Clear Lake, Lake Co., Cal., and I propose to name it in honor of Mr. Wm. H. Dall. The specimens before me were fifteen, fresh, remarkably uniform in their whole appearance; all were more or less covered with a dark brown, hard crust of slime and dirt, generally thickest around the aperture. Doubtless this coating is done "purposely" by the animals, as in many other species also. When cleaned, it shows about the size and shape of a well-grown *Vertigo ovata*, Say, but by a good eye or under a glass is at once recognized as something else, by the rounded aperture and the absence of lamellæ.

DISTRIBUTION OF UNIONIDÆ IN THE THREE RIVERS,
MAHONING, CUYAHOGA AND TUSCARAWAS.

BY GEO. W. DEAN, KENT, OHIO.

The table given below, while making no pretense to absolute accuracy, is a fair approximation of the distribution of Unionidæ in the three largest rivers and their tributaries in northeastern Ohio. Although they afford us no peculiar species, unless it be the *Unio Kirtlandiana* Lea of the Mahoning River, they still present some points of interest. The reader must bear in mind that species are not found equally distributed. Some may be found almost anywhere and others at only one place in a whole river. The Mahoning and Tuscarawas Rivers are tributaries of the Ohio; the first through the Beaver, the latter through the Muskingum. The Cuyahoga rises about thirty-five miles east of Cleveland and empties into Lake Erie at that city. Its course is southwest to within two or three miles of Akron from which it is almost due north to its mouth. Through this valley runs the Ohio canal, and this canal connects this river with the Tuscarawas by a rise that required sixteen locks, the whole distance between the two rivers being about six or seven miles. It will be seen by the following tabular statement that *Unio ligamentinus*, *rectus*, *rubiginosus* and others are common to the Tuscarawas and lower Cuyahoga, and entirely absent in the Mahoning and upper Cuyahoga. Above the connection of the Cuyahoga with the canal are several falls above which are found only five or six species, but below there the number is largely increased by those named above and a number of other Tuscarawas forms. The interesting question presented is, have these Tuscarawas forms been introduced through the canal during its fifty or sixty years of existence? A list of the forms found in streams that empty into Lake Erie, and have no connection by canal or otherwise with the Ohio, might throw some light upon the subject. In conclusion I will say that geographical distribution is of paramount importance to the conchologist and collector, and the least contribution to the limited knowledge of the subject we have at present ought to be welcomed.

Mahoning River,	Cuyahoga River,	Tuscarawas River.
	<i>Anodonta.</i>	
decora Lea,	.....	plana Lea?
subcylindracea Lea,	subcylindracea Lea,	subcylindracea Lea.
edentula Lea,	edentula Lea,	edentula Lea.
imbicilis Say (very rare),	?	?
pavonia Lea, Var.	pavonia Lea (typical) Above the falls.	pavonia Var.

Margaratana.

.....	.....	deltoidea Lea.
complanata Lea,	complanata Lea,	complanata Lea.
.....	(canal)	dehiscens Lea (rare).
Hildrethiana Lea,	.....	Hildrethiana Lea
(rare)		(rare).
marginata Say,	marginata Say,	marginata Say?
rugosa Barnes.	rugosa Barnes.	rugosa Barnes.

Unio.

.....	alatus Lea,	alatus? Lea.
circulus Lea,	circulus? Lea,	circulus Lea.
clavus Lam (common),	.....	clavus Lam (rare).
coccineus Lea,	coccineus Lea,	coccineus Lea.
cylindricus Say,	.....	cylindricus Say.
fabalis Lea,	.....	.....
gibbosus Barnes,	gibbosus Barnes,	gibbosus Barnes.
iris (rare),	.....	? ?
.....	.....	irroratus Lea.
.....	Novæboraci Lea,	Novæboraci Lea.
luteolus Lam.,	luteolus Lam.,	luteolus Lam (rare).
multiradiatus Lea,	multiradiatus Lea,	.....
.....	nasutus Say,	.....
occidens Lea,	occidens Lea (rare),	occidens (common)
(subovatus)		
parvus (reservoirs)	parvus (reservoirs)	? ?
Barnes,		
.....	.....	perplexus Lea (rare).
phaseolus Hild.,	? ?	? ?

pressus Lea,	pressus Lea,	pressus Lea.
.....	.....	pustulatus Lea (rare).
.....	.....	pustulosus Lea.
.....	.....	pyramidatus Lea.
rangianus Lea,	.....	rangianus Lea.
.....	rubiginosus Lea	rubiginosus Lea.
.....	(common),	(common).
.....	rectus Lam.,	rectus Lam.
Kirtlandiana Lea,	.....	? ?
.....	? ?	subrotundus Lea.
triangularis Lea,	.....	triangularis Lea.
tuberculatus Barnes,	.....	tuberculatus Barnes.
undulatus Barnes,	.....	undulatus Barnes.
verrucosus Barnes	.....	verrucosus Barnes
(rare). Very large.		(rare).

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

FAMILY UNIONIDÆ.

189.—*Unio radiatus*.

Syns.:

Mya radiata, Gm. Dill. Wood.

Mya oblonga, Wood.

Lampsilis radiata, Stimp. Morse.

Unio Virginiana, Lam.

Unio radiata, modern authors.

Shell transversely oblong-ovate, broader and angular behind; beaks nearer the anterior extremity; epidermis concentrically wrinkled, olivaceous with numerous lines of a greenish color radiating from the beaks to the margin; nacre bluish-white, iridescent at the posterior portion, with flesh colored tints; cardinal teeth strong, erect, triangular pyramidal. Length 3 inches, height $1\frac{1}{2}$, breadth $1\frac{1}{5}$.

It inhabits ponds and rivers on the eastern slope of the Alleghanies and is quoted as being one of our most common species, but it is

not the case in Rhode Island, being extremely local, though abundant where found at all. Up to October of 1872, it had never been collected in this State. I had frequently examined our various ponds and rivers with particular reference to this species, without success, but in riding past Mashapang Pond one day in October, I noticed that the water was extremely low, and on going down to the edge of the pond I saw numerous tracks of *Unio* in the sand, and among them were some which seemed a little different in shape from those made by the *U. complanatus*. On following up these tracks (some of them eight or ten feet in length) I found at the end of each, burrowed in the sand, the long-looking for *radiatus*.

Genus *Margaritana*, Schum., 1817.

Shell transverse, inequilateral; hinge like that of *Unio*, but destitute of lateral teeth. There are forty species, three of which inhabit Rhode Island.

(*To be continued.*)

PUBLICATIONS RECEIVED.

THIRD SUPPLEMENT TO FIFTH VOLUME OF TERRESTRIAL MOLLUSKS OF THE UNITED STATES. By W. G. Binney. (Ex. Bull. Mus. Comp. Zool., vol. xix, pt. 4, May, 1890.) This Third Supplement equals our expectations, in fully sustaining the author's reputation for careful and reliable work. In it are described and figured the species of land mollusks made known since the publication of the Second Supplement. Mr. Binney, while not departing from that wise conservatism, in regard to specific limitations, which has made his successive volumes models of careful systematic work, devotes more space than formerly to the important subject of variation. Geographical distribution also has much attention. The species and varieties figured and described are as follows: *Zonites minusculus* var. *Alachuana* Dall (Florida), *Succinea chrysis* and *annexa* Westerlund (Alaska), *Zonites ligerus* var. *Stonei* Pilsbry (Del.), *Z. Sterkii* Dall (Ohio), *Pupa Holzingeri* Sterki (Minn., Ill.), *Zonites Singleyanus* Pilsbry (Texas), *Z. Dallianus* Simpson (Fla.), *Microphysa*? *dioscoricola* Ad. (Fla.), *Polygyra auriculata* var. *microforis* Dall (Fla.), *P. Jacksoni* var. *deltoidea* Simpson (Ind. Ter.), *Mesodon Kiowaensis* Simpson (Ind. Ter.), *Acanthinula granum* Strebel &

Pfeiffer (Fla.), *Onchidium floridanum* Dall (Fla.), *Limax Hemphilli* W. G. B. (Cal.), *Arion joliotatus* Gould (a species of *Prophysaon*), *Prophysaon caruleum*, *fasciatum*, *Pacificum*, *flavum* and *humile* of Cockerell, *Polygyra Roperi* Pilsbry (Cal.), *Patula strigosa* vars. *subcarinata*, *jugalis* and *Buttomi* Hemphill, *Zonites selenitoides* Pilsbry, *Z. Simpsoni* Pilsbry, *Pupa calamitosa* Pilsbry, *Helix tudiculata* var. *Binneyi* Hemphill, *Helicodiscus fimbriatus* var. *Salmonensis* Hemphill (Idaho & Oakland, Cal.). The discussion of the *Helix major-albolabris-andrewsi* group, and of the western slugs of the genera *Hemphillia* and *Prophysaon* are of great interest. The contribution to the literature of our slugs is particularly timely and valuable. Mr. Binney considers *Bulimulus Hemphilli* Wright a synonym of *B. Floridianus* Pfeiffer. The plates, 10 in number, are admirably drawn and printed; six of them illustrating slugs. The original drawings are by Binney, A. F. Gray, T. D. A. Cockerell and A. H. Baldwin. There are also numerous wood-cuts in the text. Whilst we would perhaps take exceptions to certain minor details of Mr. Binney's classification, the work as a whole, is certainly very creditable to the distinguished author.—H. A. P.

GENERAL NOTES.

HELIX HORTENSIS IN NANTUCKET. Dr. Harrison Allen of Philadelphia, whose summer home is at the picturesque little village of Siasconset, on the island of Nantucket, has presented me with four specimens of *H. hortensis* taken there by him:—the only ones he has seen. This is the most southerly locality for this species yet known. I am not inclined to believe it a native American, as Mr. Cockerell thinks, but would rather regard it as an immigrant, who has come over, like the rest of us, in comparatively recent times, and is gradually extending its range. Two of the specimens are yellow, one with 4, the other with 5 brown bands; one shell is uniform yellow (form *lutea* Moq.); one is yellow with 5 translucent, almost colorless bands, the lower two very wide, almost coalescent.—H. A. PILSBRY.

SPECIES DETERMINED. From E. W. Roper, Revere, Mass.

1, *Nerita fulgurans* Gmel. 2, *Perna ehippium* Lam. 3, *Columbella nitida* Lam. 4, *Conus mus* Hwass. 6, *Litorina ziczac* Dillw. 7, *Cerithium minimum* Gmel. 8, *Modulus Floridanus* Conr. 9, *Ricinula nodulosa* Ad. 10, *Purpura deltoidea* Lam. Locality, Vera Cruz, Mex.—H. A. P.

THE NAUTILUS.

VOL. IV.

JULY, 1890.

No. 3.

A NEW EOCENE FOSSIL FROM TEXAS.

BY T. H. ALDRICH, CINCINNATI, OHIO.

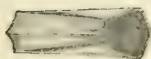
Omalaxis Singleyi n. sp.

Shell flat, smooth, tricarinate, one carina on each edge and one on the periphery of the body whorl; apex impressed; whorls four, but three showing above, suture deeply excavated, upper and lower part of whorls inclining toward suture. Mouth nearly quadrangular. Length 1mm.; breadth 3mm. Locality: Lee Co., Texas.



—

This is the second species now known from the Atlantic Eocene. The first was described by I. Lea from the Claiborne sand as "*Orbis rotella*." For the generic synonymy see Dall's "*Report on the Mollusca*," 1889, part 2, p. 276. Discovered by J. A. Singley, Esq., and named in his honor.



NEW FORMS OF WESTERN LIMNIADES.

BY HENRY HEMPHILL, SAN DIEGO, CAL.

Limnæa (*Leptolimnea*) *Pilsbryi* Hemphill.

Shell elongated, narrow, somewhat solid, smooth, of a light horn-color; consisting of about six roundly-shouldered whorls, the last flattened on its sides and occupying a little more than half the length

of the shell; lines of growth very delicate, suture deep; aperture oval, longer than wide, outer lip acute; inner lip subreflexed.

Length $\frac{3}{4}$, breadth $\frac{1}{2}$ of an inch.

Habitat: Fish Spring, Nevada.

I collected a few specimens of this interesting shell in the month of June, 1868, at this locality, after a long and hard day's ride of 40 miles horseback. Another long ride next day of 50 miles to water, compelled an early start and thus the opportunity to secure more specimens was lost.

Limnæa stagnalis var. *occidentalis* Hemphill.

Shell large, globose, very thin and fragile; of a light horn-color; whorls five, the last rapidly increasing in size and constituting about three-quarters the entire length of the shell and generally covered with revolving malleations separated by obtuse, irregular lines more or less conspicuous; lines of growth somewhat irregular and conspicuous; spire short, sharp and acute, consisting of three obliquely twisted whorls and the nucleus; suture well impressed; aperture globosely oval, longer than wide; outer lip thin, sharp, acute, subreflexed near its junction with the columella; inner lip sinuous and well defined, columellar strongly twisted.

Length of the largest specimen $1\frac{5}{8}$ inch, breadth 1 inch.

Habitat: Lake Whatcom, Whatcom Co., Washington.

There is considerable distortion in the fifteen or twenty specimens of this interesting variety that I found on the shores of the above lake in November, 1889. This shell would probably be considered new by many conchologists, but I regard this as simply a telescoped, so to speak, variety of the metropolitan *stagnalis*. It might be called with propriety the *L. auricularia* of America, and occupies a position midway between *L. stagnalis* and *L. auricularia* and creates a suspicion in my mind that the latter after all is but a form of the former species. I found two living specimens in the lake. These I intended to have preserved in spirit, but not having a large mouthed bottle at hand I placed them in a box with some living *Selenites Vancouverensis*, intending to remove them before night; this I neglected to do and the next morning when I opened the box, I was horrified to find two of the largest *Selenites*, had their long white bodies inserted into the shells of their aquatic cousins and all that remained of the soft parts of my new-found treasures, was the tip end of their bodies in the last whorl of the spires of their shells.

Physa var. Columbiana Hemphill.

Shell globose or moderately elongated, shining, solid; of a dark horn, or chestnut color; whorls four, the last occupying about three-quarters the entire length of the shell; suture well defined and generally marked by a fine yellowish line; spire short, obtuse; aperture long and moderately wide; outer lip simple, thickened internally with a dark chestnut deposit that shows on the outside as a yellowish band; columella lip somewhat sinuous, and well folded on the body whorl.

Length of an elongated specimen $\frac{5}{8}$, breadth $\frac{5}{16}$ of an inch.

Length of a globose specimen $\frac{1}{2}$, breadth $\frac{5}{16}$ of an inch.

Habitat: Columbia River, Astoria, Oregon.

I collected nearly two hundred specimens of this shell at the above locality in the month of November, 1877. They were found adhering to the underside of stones that are submerged several feet during high tide, associated with *Goniobasis plicifera* var. *bulimoides* Tryon. On comparison with specimens of *Physa ampullacea* Gld. collected by me in Owens River Valley, in 1869, and a few specimens from the upper Columbia also collected by myself, I am satisfied this shell is a small or miniature form of that species and not a variety of *Physella globosa* Hald. as supposed by the late G. W. Tryon. There is considerable variation in the form of this shell, but there is no plication on the columella, the only character in the genus *Physella* worth noticing. My specimens of *Physa ampullacea* Gld. from Owens River Valley, are very large and globose, with the columella strongly twisted, and are fully as well qualified to enter the genus *Physella* as the present specimens.

**NOTES ON SOME NORTH AMERICAN PUPIDÆ WITH DESCRIPTIONS
OF NEW SPECIES.**

BY DR. V. STERKI, NEW PHILADELPHIA, OHIO.

Pupa Hemphilli sp. nov.

In examining a lot of about 45 specimens named *P. calamitosa* Pilsb., from the banks of St Thomas River, Lower California, I found that there were two distinct forms in them. The author says, in his description of *P. calamitosa*:¹ "Several specimens have only one lamella on the outer lip and are rather larger than the

¹ The Nautilus iii, No. 6 (Oct., 1889).

typical form described," represented in Pl. I, fig 6 (l. c. No. 7). Probably I had a greater number of examples at disposition than Mr. Pilsbry; the two forms proved to be distinct by an entirely different formation of the lamellæ as well as of the basal part of the shell. And among the whole number I found not one intermediate or doubtful specimen. There is no doubt but that we have to consider them as being specifically distinct, the more so since they live together in the same locality. For the new species I would propose the name: *P. Hemphilli*, in honor of the man to whom we owe so many valuable additions to our malacological fauna.

As in shape and general appearance the two species are almost alike, it may be the best way to characterize the one in question by comparing it with *P. calamitosa*, Pilsb. *P. Hemphilli* averages a trifle larger than its companion, but either is somewhat variable in size. While *calamitosa* has a minute perforation, *hemphilli* is umbilicated in quite a peculiar way: there is a nodule-like projection on the umbilical part of the last whorl producing a rima beside the umbilicus; in *calamitosa* there is nothing of this formation. On the other hand, the latter has a small but distinct groove-like impression just at the base, near the aperture appearing as a slight projection inside; this feature is wanting in *hemphilli*.—Lamellæ: in the latter species, when looking from front only one is generally seen in the palatal wall, corresponding to the superior one in *calamitosa*, but longer, *i. e.*, beginning deeper in the throat, and fairly seen on the outside, also marked there by a corresponding impression, ascending in a curve from near the base; a little distant from its inner end, just above the projection mentioned, there is another lamella beginning, directed toward the base and ending there, also seen on the outside. Quite generally there is a very small, thin, but well formed lamella in the palatal wall near the projecting auricle. The columellar fold is quite short and small in *hemphilli* yet consisting of a vertical and a horizontal part; the (main) apertural lamella is decidedly longer in our species, and the supra-apertural higher and entire while in *calamitosa* it is evidently composed of two parts marked by an indentation in the middle, or even entirely separated, in quite mature specimens.

About 20 examples, collected at San Diego, Cal., by Mr. Hemphill, are all *P. hemphilli*, no *calamitosa* among them. They are little different from the St. Thomas River specimens, except by a somewhat shorter palatal lamella.

REMARKS ON UROSALPINX PERRUGATUS CONRAD.

BY FRANK C. BAKER, PHILADELPHIA, PA.

This mollusk was described by Conrad in the American Journal of Science, New Series, vol. II, 1846, p. 397, as follows: "*Fusus perrugatus* Conrad. Manatee River. Fusiform, with remote longitudinal ribs, and large prominent revolving lines alternating with a fine line; whorls longitudinally rugose, upper half flat and oblique; aperture rather more than half the length of the shell, purple within; labrum striate; color of the exterior cinereous. Proportionally wider than *F. cinereus*, with fewer and larger ribs and lines."



The only references I have been able to find, which have been made to this shell since the foregoing description, are those by Dr. W. H. Dall in Bulletin No. 37 of the United States National Museum, p. 120, and in the Report on the Blake Gasteropoda, p. 214, in which he says: "There are three American species known to belong to it; (*Urosalpinx*):—*U. cinereus* Say, ranging from Massachusetts to Florida; *U. tampaensis* Conrad, known only from the west coast of Florida lastly *U. perrugatus* Conrad."

Among the specimens of *cinereus* in the collection of the Academy of Natural Sciences of Philadelphia I found several trays of *perrugatus*, and as no really good description, and no figure has been published of this species, I take this opportunity of redescribing and figuring the same.

***Urosalpinx perrugatus* Conrad.**

Shell fusiform, solid, cinereous, under the lens showing a scabrous texture; whorls six, subcarinated, longitudinally plicate, the folds eight in number on the last whorl, large, rounded; there are eighteen strong, spiral liræ, with fine intervening threads; aperture ovate, rather more than half the length of the entire shell; outer lip rounded, edge scalloped by the spiral liræ; inner lip arcuate, smooth; canal longish, open, reflexed; umbilicus none, but there is

a furrow in its place, bounded by a fasciole; aperture purple within; apex minute, knob-shaped, smooth.

Alt. 32, diam. 15 millimeters. Aperture (including canal) alt. 6, diam. 6 millimeters.

It is separated from *cinereus* by its greater proportional width, its stronger ribs and spiral liræ and more scabrous texture. It is at once separated from *tampaensis* by the sculpture; that of *tampaensis* being latticed by the intersection of the longitudinal and spiral lines; there are other differences which will at once distinguish it from that species.

Specimens have been collected at Cedar Keys, by Mr. Henry Hemphill, and I understand from collectors that it has been found elsewhere on the west coast of Florida.

PRESERVATION OF COLOR IN FOSSIL SHELLS.

BY CHARLES R. KEYES.

Recently some interesting fossils have come under my notice: *Trachydontia wheeleri* Swallow from the Coal Measures of Illinois. The group is a member of the Naticidae, a family which in the American Palæozoic is also represented by several other genera. The shells alluded to, while Natica-like in general aspect, are rather small in size, massive, with the surface covered with numerous conspicuous nodes, and the callosity of the inner lip greatly thickened and extended. Among the specimens are a number in which the coloration of the callous portions and of the interior surface is still visible. In some individuals the color is an intense shining black; in some a purplish-black; in others dull faded purple; and in a few the color has entirely disappeared. Aside from the apertural parts all traces of the original coloration of the shell are lost. Apropos it may be mentioned that de Koninck has also called attention to examples of *Macrochilus* from the Carbonic of Belgium, having the maculate surface still apparent. The markings in this instance consist of series of large rectangular spots. And it is presumable that the shells of this Carbonic group were originally brightly colored and presented an appearance similar to many recent forms of the genera *Mitra* and *Conus*. In the Löss (post-pleiocene) deposits of the Upper Mississippi Valley there are some forty or more species of land and fluviatile shells known; the majority of which are still found living with-

in the limits of the region. Two terrestrial forms *Patula strigosa* Gould, and *P. alternata* Say, often still retain in the fossil state the red surface markings. Several similar cases other than those here referred to, might also be mentioned, but it is scarcely necessary in the present connection.

In its broadest sense, the term fossil is applicable to all naturally buried organic remains; whether recently entombed, or having been inclosed for countless ages in the earth's strata. In the general process of petrification of organic structures the animal matter is quickly destroyed and only the hard parts escape obliteration. When the proportion of organic to inorganic material is large there is usually a more or less complete effacement of all indications of life; but when the mineral constituents predominate, as in the shells of mollusks, brachiopods, and the tests of echinoderms, etc., these parts are often preserved intact, with simply a loss of animal matter. It frequently happens, however, that the calcareous shell is gradually and completely replaced by some other mineral substance, as iron or silicon, yet preserving perfectly the form and ornamentation. As might be expected under the circumstances the original coloration of fossil shells is very rarely retained; and the few instances noted are therefore of particular interest as revealing certain phases of molluscan life that existed in ages gone by. In the later geological deposits the retainment of some trace of coloration in shells is of course very much more probable than in the earlier rocks.

THE ISAAC LEA CHAPTER OF THE AGASSIZ ASSOCIATION.

BY DR. M. L. LEACH.

Referring to the organization of the American Association of Conchologists, notices of which have appeared in recent numbers of the NAUTILUS, it may not be out of place to mention that a similar society, having the same objects in view, is already in the third year of its existence. The Isaac Lea Chapter of the Agassiz Association, is made up of members widely scattered over the country, to whom the study of conchology is of special interest. There has never been a meeting of the Chapter, but the voting and all society business is done by correspondence. No fee is required for admission, and there are no assessments or dues. The members are

expected to correspond with each other, to exchange specimens, and to help each other in their scientific work. Once a year the members report to the secretary, and the secretary reports to the president of the Association, Prof. H. H. Ballard, Pittsfield, Mass. Prof. Josiah Keep, Mills College, Cal., is president of the Chapter, and Dr. M. L. Leach, Wexford, Mich., is acting secretary.

STRENGTH OF LIMPETS.¹

According to J. Lawrence Hamilton, M. R. C. S., the limpet is probably the strongest of known animals, excepting perhaps the *Venus verrucosa* of the Mediterranean Sea, which pulls 2,071 times its own weight when out of its shell. At Folkestone, Eng., Mr. Lawrence Hamilton found that the common sea shore limpet which weighs about half an ounce when deprived of its shell, required a force exceeding 62 lbs. to remove it from its powerful grip upon the rock, or 1,984 times its own dead weight. The superficial area of the base of the limpet experimented with measured 2.4 sq. inches. Mr. H. doubts whether the limpet's adhesive force has anything to do with the question of atmospheric pressure. A curious illustration of the limpet's strength is given by another naturalist. On a warm dry day in summer, on the Northern Coast of Scotland, a hare approached a limpet and endeavored to moisten its tongue by contact with the watery looking flesh of the latter; instantly, the limpet closed on to a rock pinning the hare fast by the tongue and holding it until the animal was caught by the observer of the occurrence.

COLLECTING CHITONS ON THE PACIFIC COAST.

Excerpts from a Diary.

BY MRS. M. BURTON WILLIAMSON.

Whilst peering under a rocky shelf (at Point Fermin) I saw something that seemed to move when I touched it accidentally with my knife. I pushed my knife under one end of it—the only end visible—

¹ We are indebted to Mr. S. R. Roberts for this interesting note on the adhesive power of the Limpet. It is from the *Illustrated American*.

and I found that the resistance was not that of a hard substance, but became less as my knife went farther under the rock and soon I had a big chiton, *Stenoradsia Magdalensis* Rve., on my knife! * * * Near where we found the *Conus* in the moss, in a shelving rock so close to another rock below it in the water that we could not remove it, we found a huge chiton. To get it out, it was necessary to break the sandy rock with a hatchet. There they lie, *Stenoradsia Magdalensis*, so close together that in less than three feet of the layer of rock that was chipped off we found over one dozen; some almost four inches in length! Just as they were collected from their damp environment they presented a beautiful appearance. On the outside, as well as inside, save three or four old fellows, the shells were a bright pink, like the interior of a pink-lined sea shell.

In a mossy carpet on a wet rock I found chitons, *Mopalia ciliata* and *M. lignosa* imbedded in the rock. Sometimes the Chitons were entirely covered with moss and could only be detected because the moss seemed to be growing in a circle. In the moss the Chitons, on the outside, were green and brown like the moss around them; under and between the rocks, they were pink; when found in little depressions in boulders out of the water, they were almost the exact color of the stone on which they lived. These were mostly the *Chaptopleura Hartwigii* Cpr. Here as elsewhere environment seems to play a most important part. Are specific differences merely the changing forms due to environment alone?

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

JUNE 28, 1890.

The annual election for officers of the association took place by correspondence, as provided for in the rules, during the week commencing June 4th. The president, John H. Campbell and the secretary, Charles W. Johnson were unanimously re-elected. For vice-president several of the members were honored with the votes of their associates, but most of those voting, were of the opinion that it would be well to have the vice-president live in the same place as the other officers, particularly during the first year, so that Mr. John Ford of Philadelphia received more ballots than all the other persons voted for and was declared elected. Mr. Ford is one of the best-equipped conchologists in America. For many years he has

been an active member of the Academy of Natural Sciences of Philadelphia, and in identifying species he is almost unrivalled. While not the largest, his collection of shells is one of the finest in America, and in his specialty, the Olividae, there is no other collection in America, which can approach it in the number and beauty of the specimens.

The Association is growing rapidly. There are now upon its rolls, representatives from Canada, Massachusetts, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, District of Columbia, Virginia, South Carolina, Florida, Texas, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Nebraska, Kansas and California. It is the intention to eventually enroll the conchologists of Central and South America, Mexico and the West Indies, as well as of the United States and Canada. From the tenor of the correspondence received by the officers, the idea of the Association meets with much favor.

Dr. V. Sterki of New Philadelphia, Ohio, requests the loan from members, of North and South American Pupidae for study and comparison. He promises to return promptly and in good condition, the specimens which may be sent to him.

Frank C. Baker, of the Academy of Natural Sciences, Philadelphia, was a member of the Academy's recent expedition to Mexico. He has returned, bringing with him numerous conchological acquisitions, as a partial result of the trip.

Rev. A. Dean of Muncy, Pa., has had the degree of D. D. conferred upon him.

The address of Prof. William H. Dall of the U. S. National Museum, Washington, upon "Deep Sea Mollusks and the conditions under which they exist" has been printed in pamphlet form. The address was delivered before the Biological Society of Washington, of which Professor Dall is the President. Another able paper of the professor's, "On dynamic influences in evolution" has also been printed in pamphlet form.

Geo. W. Harper, Principal of the Woodward High School, Cincinnati, Ohio, is the author of a "Catalogue of the Unionidae of the Mississippi Valley."

Rev. W. M. Beauchamp, Baldwinsville, N. Y., is the author of "Land and Fresh Water Shells of Onondaga County, with a supplemental list of New York species."

Mr. L. B. Elliot, Iowa City, Iowa, is studying the dentition of mollusca and would be pleased to receive alcoholic specimens from the members.

The officers of the Association return thanks for the many kind messages conveyed to them in the letters of the members.

George T. Marston, Green Bay, Wis., has collected over 100 species from the vicinity of his place of residence. He makes a specialty of Wisconsin Mollusca.

A new circular is being prepared and will be sent, within a week, to all persons, who have been proposed for membership during the past month. Some care in the consideration of applications is necessary, as the officers have been written to several times concerning a class of collectors, who systematically commit frauds, by soliciting shells in exchange and not making any return. It is important that such persons should not be admitted to the Association.

T. Marshall Fry, Syracuse, N. Y., writes: "I think the Association may be made a success, if it is taken hold of with a will, and does not become too large and unwieldy."

Miss Ida M. Shepard, Long Beach, Cal., writes: "Last week we found a *Cypraea spadicea* alive, about eleven miles north of here. How much farther north they are found, I do not know, but think not very much." She has collected about 230 West Coast species of shells.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

190.—*Margaritana arcuata*, Barnes.

Shell large, more or less kidney shaped, very inequilateral, thick and strong; beaks not prominent, much eroded; epidermis tar-colored; interior smooth, *bluish white with a greenish margin*; cardinal teeth, two in the left valve, erect, strong and pyramidal and one in the right valve, long, grooved and twisted. Length, $4\frac{1}{2}$ inches; breadth, $1\frac{1}{2}$ inch; height, 2 inches. Some authors consider this species identical with the British shell called *margaritifera* and credit it with a circumboreal distribution quoting it from Europe, Siberia, British America and the Northern U. S. If this be so, it is the only species of fresh-water clam known to both continents. The European species is well known as the pearl-bearing *Unio* par

excellence, but I have never heard of pearls being found in our American shell; the interior of the British shell is described by Reeve as being *rose colored* or *salmon* with much iridescence and in another place as having a bluish-tinted interior; our shell has not these colors. The two species look very much alike, but there are differences to be observed in the appearance of the exterior as well as interior of the valves. The British species is found only in mountainous regions while ours is not so particular in its habitat. It occurs in running streams in Maine, New Hampshire, Vermont and Mass., and according to Gould is confined to the interior, and never found near the sea coast. The only specimens ever found in R. I.—some dozen or more—were obtained by a young lad of this city, Master Eugene Austin, in Roaring Brook, Exeter, while on a visit to his friends in that town in 1872.

(To be continued.)

PUBLICATIONS RECEIVED.

ON SOME MARINE INVERTEBRATA collected by Dr. S. M. Dawson in 1885, on the coast of British Columbia, by J. F. Whiteaves, (ex. Trans. Roy. Soc. Can. iv). Among the Gasteropoda and Pelecypods, *Leptochiton cancellatus*, *Bela violacea*, *Cancellaria circumcincta*, *Admete viridula* *Pecten alaskensis*, *Yoldia thraceiformis* and *Sipho Verkruzeni* are northern forms, new to the Vancouver district; while *Solariella peramabilis*, *Barleeia subtenuis* *Limatula subauriculata* and *Leda acuta* are Californian shells, now for the first time reported so far northward. *Astarte undata* and *Eulima incurva*, if correctly identified, seem to be new to the fauna of the West Coast. *Margarita cidaris*, of which a fine series was collected, was previously known by a single specimen. *Cadulus aberrans* and *Leptochiton punctatus* are described as new. *Leptothyra sanguinea* L. is reported as collected at a number of localities, and its distribution given as "Japan, California and the Ægean Sea." We have already shown that the Mediterranean, Japanese and Californian shells belong to three perfectly distinct species; the true *L. sanguinea* being confined to the first named locality. To our Californian shell we gave the name *L. Carpenteri*. The list is an interesting addition to our knowledge of Vancouver mollusks.—H. A. P.

DESCRIPTION OF A NEW SPECIES OF LAND SHELL from Cuba.—*Vertigo Cubana*. By W. H. Dall, Curator dept. of moll., U. S. Nat. Mus. 1890, p. 1. This is a remarkable form of *Vertigo*. It is a minute, oval shell. The surface strongly ribbed, aperture bearing lamellæ. The author compares it to the Sandwich Island *Pupa lyrata* of Gould.—H. A. P.

FIG. 1.



FIG. 2.



FIG. 3.



FIG. 7.



fig.A.

fig.B



fig.C.



FIG. 4.



FIG. 5.



20/

FIG. 6.

Fig. A



20/

Fig. C



Fig. B



THE NAUTILUS.

VOL. IV.

AUGUST, 1890.

No. 4.

NEW UNITED STATES PUPIDÆ.

The plate opposite this page illustrates the species of Pupidæ described during the past year in the pages of THE NAUTILUS, by Dr. V. Sterki and others. The illustrations have been very kindly loaned by Mr. W. G. Binney.

Fig. 1. *Vertigo Binneyana* Sterki described in the Proceedings of the Academy of Natural Sciences of Philadelphia. See also THE NAUTILUS, March, 1889, p. 125.

Fig. 2. *Vertigo Dalliana* Sterki. See THE NAUTILUS for June, 1890, p. 19.

Fig. 3. *Vertigo rugulosa* Sterki. The Proceedings of the Philadelphia Academy, 1890, contain the description of this form.

Fig. 4. *Pupa Clementina* Sterki.

Fig. 5. *Pupa Oscariana* Sterki. Described in THE NAUTILUS.

Fig. 6. *Pupa Hemphilli* Sterki. THE NAUTILUS, July, 1890, p. 27.

Fig. 7. *Pupa syngenes* Pilsbry. THE NAUTILUS, May, 1890, p. 3.

The figures are from drawings by Dr. Sterki.—H. A. P.

NOTES ON SPHÆRIUM SECURE PRIME.

BY EDWARD W. ROPER.

The most common New England *Sphærium*, and the one most often incorrectly identified is *S. secure* Prime. It flourishes equally

well in ponds, rivers, brooklets and ditches, if only the water is clean. If the bottom is of mud, it will be found clinging to sticks, stone, dead leaves and submerged vegetation, climbing often nearly to the surface of the water. It is a small shell usually less than one-third of an inch long, and in color bright yellow, unless covered with vegetable mould. The animal is pink, and shows through the shell, so that the species may be recognized by its peculiar rosy glint in the water. The shell is trapezoidal, slightly oblique, acutely rounded in front, more elevated and truncate posteriorly. The beaks are approximate at the apex and project forward. The ends seem sharply pinched and there is a depression each side of the beaks, giving the impression of a ridge from the apex to each ventral end. This is the typical form and I have never seen it from south of New Jersey, nor west of New York.

Mr. H. F. Carpenter has described a Rhode Island shell as *Sphaerium deformis*, which should be considered a variety of *S. secure*. It is somewhat larger, more elongated, and the basal margin compressed and distorted. From Adamsville, N. J., I have also many specimens of *Var. deformis*, smaller than the Rhode Island shells, but similarly twisted.

While the typical *S. secure* is an eastern shell, the more western states furnish some distinct varieties. From Traverse City, Mich., comes a very yellow, elevated form, the animal of which is also yellow. This is probably the shell described by James Lewis as *S. croceum*, and said to be found on gravel bottoms. This, however, may be a condition, rather than a habit, as the same thing occurs in the case of *S. secure* at Readville, Mass., in a clean pond.

From Fenton Co., Mich., I have a number of solid, globose, brown shells, which were identified at the Philadelphia Academy of Sciences as *S. sphaericum* Anth. They are thicker and more globular than any New England specimens of *S. secure*, excepting those from Readville, which are equally solid, with beaks more pointed, and in color yellow. Even more closely resembling the Readville shell is a form from Mercer Co., Ill., of an olive green color. These forms are liable to be confounded with *S. occidentale* Prime. The latter is of the same size, but is perfectly oval, and the rounded beaks hardly rise above the outline. *S. partumeium* is larger and more lenticular, and *S. truncatum* is thinner, pellucid and less tumid. A Kansas shell going the rounds as *S. sphaericum*, is another species, much larger, and allied to *S. contractum* and *S. elevatum*.

In conclusion, I would like to say a few words about collecting these puzzling shells. In common with others of the family, they arrive at maturity in the spring, and the adults are generally dead by midsummer. Those taken later in the season will be young and immature. It is more difficult to collect in the spring, when the water-courses are full to overflowing, but I have had little trouble since adopting a simple suggestion from my friend, George J. Streater, of Garrettsville, O. An ordinary wire dish-cover tied to a long pole is an effective scoop, and the meshes are fine enough to prevent the escape of small shells, while yet the mud can be washed out. Young shells will often be found within the adults, and should be saved, because in making exchanges, a set showing various stages of growth is the most useful for study and comparison.

NEW VARIETIES OF WESTERN LAND SHELLS.

BY HENRY HEMPHILL, SAN DIEGO, CAL.

***Helix ptychophorus* var. *castaneus* Hemphill.**

Shell umbilicated, globosely depressed, of a dark chestnut color; surface covered with coarse, irregular, widely separated lines of growth, and crowded, microscopical revolving lines; whorls $5\frac{1}{2}$, convex, the last slightly descending in front, spire elevated; suture well impressed, aperture subcircular; lip white, reflected and partially covering the umbilicus, its terminations approaching; umbilicus small and deep.

Height $\frac{5}{8}$ inch, diameter 1 inch.

Habitat, Old Mission and Rathdrum, Idaho.

I regard *H. ptychophorus* as the progenitor of what I call the *Townsendiana* group of west coast land shells, and this colored variety seems to still further indicate its relationship to *Townsendiana*, for the spire whorls of nearly all the specimens of *Townsendiana* that I have collected are chestnut colored. *Townsendiana* does not begin to put on its wrinkles until it has made about four revolutions of the shell. The wrinkles are probably due to its environment.

***Helix tudiculata* var. *subdolosus*, Hemphill.**

Shell narrowly umbilicated; globosely depressed, of a dark yellowish color, surface somewhat shining, covered with oblique striæ,

interrupted by numerous wavy lines and oblong blister-like wrinkles, hardly perceptible to the naked eye; whorls $5\frac{1}{2}$, convex, striped by a single chestnut band, double margined by lighter ones; spire very little elevated, suture well impressed; lip simple reflected, and nearly covering the umbilicus, its terminations approaching and joined by a thin callus; umbilicus narrow and small.

Height $\frac{5}{8}$ inch, greatest diam. 1 inch, lesser $\frac{7}{8}$ inch.

Habitat San Jasinto Valley, San Diego Co., Calif.

A very depressed form, quite variable in size, some of the specimens not being more than half the size of the measurements given. It is lighter colored than any of the southern varieties of *tudiculata*, except var. *Binneyi*.

Selenites Vancouverensis, var. Keepi, Hemphill.

Shell umbilicated, greatly depressed, thin, smooth, shining transparent, scarcely marked by the delicate wrinkles; very light horn color; whorls over four, somewhat flattened above and beneath, and scarcely descending at the aperture; spire flat, not rising above the body-whorl; suture well impressed; umbilicus moderately large, exhibiting most of the volutions; aperture transversely subcircular, wider than high; lip simple, thickened, sinuous above, very slightly reflected at the base, ends scarcely approached.

Width $\frac{5}{16}$ inch, height $\frac{1}{16}$ inch.

Habitat, Hills near Oakland, California.

One specimen only.

This rare and interesting little shell I collected some years ago. It is a perfect miniature form, in every respect, of *S. Vancouverensis*. I regard it as an extremely small variety of that so-called species. It is about the size of the variety of *S. Duranti* lately described as *S. carlata* Mazyek, but differs very materially in form, sculpture and the general texture of the shell. It differs from var. *Catalinensis* in being more robust, larger, and has a smaller umbilicus. I dedicate this pretty little shell to Prof. Josiah Keep of Mills College, California, who has done so much through his interesting little book to stimulate the study of West Coast shells.

Selenites Vancouverensis var. hybrida Hemphill.

Shell broadly umbilicated, depressed, slightly convex above, surface shining, polished, of a dark yellowish-green color, lines of growth coarse, rib-like and regular on the spire, finer and more irregular on the body-whorl, crossed by fine revolving lines that be-

come fainter on the last whorl, suture well impressed; aperture rounded, broader than high, greatly indented above; lip simple, very little reflected below at its junction with the columella, very sinuous above, its terminations joined by a very thin callus.

Height $\frac{3}{8}$ inch, breadth 1 inch.

Habitat, Astoria, Oregon.

In the strong rib-like sculpturing of the spire, depressed form and sinuous lip, it resembles *sportella*. In its greater diameter, dark greenish color, and the absence of the decussating sculpture on the last whorl it approaches *Vancouverensis*.

All our American *Selenites* commence life with a finely granulated shell. When they have attained about two whorls the striae begins to appear and increase in strength as the shell increases in size.

It is well known that all shell-bearing mollusks construct their shells, in obedience to the laws of their constitutional characteristics and the environment, among which I include affinity of matter and mechanical skill, the latter a faculty possessed to a greater or less degree by all animals. Some individuals in a colony of shells display greater mechanical skill than others, or possess stronger imitative powers, and closely follow the lines and styles of their forefathers, strictly attending to the details of sculpturing, not omitting a rib or line. Other individuals of the same colony, not having this imitative faculty so strongly developed, may change or vary the form of the shell by constructing it with more convex whorls generally resulting in a narrower or more elevated shell; or they may flatten the whorls, resulting in a broader and depressed form. Some modification of the umbilicus generally follows the change in the form of the shell. In both cases the sculpturing may be what we call characteristic of the species, or may be more or less modified, by the omission of one, two or more ribs, or the ribs may be more irregular in shape. A few lines may also be dropped, perhaps some added, or the entire surface may be modified in obedience to the laws of the mechanical skill possessed by the individual, and the affinity of matter secreted by the animal for the purpose of constructing the shell. An examination of a large number of *Selenites concava* and of our west coast forms, convinces one that the entire group of American *Selenites* is the offspring of a single common type.

A NEW PUPA.

BY DR. V. STERKI, NEW PHILADELPHIA, OHIO.

Pupa clementina, sp. nov. (Plate 1, figure 4.)

Shell very minute, narrowly perforate, cylindrical, pale horn colored, transparent, with rather obtuse apex; whorls $5\frac{1}{2}$, regularly increasing, moderately rounded, with rather deep suture, smooth, with few microscopic striae, somewhat shining: last whorl occupying rather more than two-fifths of altit., somewhat ascending to the aperture, with a slight, revolving impression on the middle of its last $\frac{1}{2}$, ending at the auricle; a very slight, flat, crest-elevation near the margin, only in the lower part; aperture lateral, scarcely oblique, subovate with the palatal margin slightly flattened, upper part of same somewhat sinuous, peristome a little expanded with a slightly thickened lip just at the margin; lamellæ 6, white: two on the apertural wall, the apertural, typical, and a rather long supra-apertural, ending in a callus at the upper termination of the palatal margin; columellar one typical, horizontal; basal very small, nodule-like, deep seated; palatals two, typical, the inferior a little longer.

Alt. 1.9, diam. 0.8 mill.; apert.: alt. 6, diam. 0.5.

Three examples of this species were collected by Mr. H. Hemphill on San Clemente Island, California, among numerous *P. californica*, Row. All were exactly alike, well formed and fully mature. They cannot be referred to any one of our species published, and doubtless represent a form of their own, although so far it was not possible to examine the soft parts.

In size, shape and general appearance it somewhat resembles *Isthmia*, yet lacks the rib-like striation; the lamellæ would be typical for *Vertigo* and some of the smaller *Pupa*, but for the presence of the well-developed supra-apertural which *P. clementina* has in common with *P. calamitosa* Pilsbry and *hemphilli* Sterki; but on the other hand, there is nothing of the characteristic palatal, or gular folds of these two species. Thus, in several regards, our form is an intermediate and connecting one between different groups, and consequently deserves our special interest.

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

JULY 31, 1890.

Since last publication of list of members, the following new members have been enrolled in the Association :

- No. 68. John L. Ogden, Philadelphia, Pa. *Naticidæ*.
69. Robert T. Jackson, Dorchester, Mass. *Pelecypoda*.
70. Shelly G. Crump, Pittsford, N. Y. *Turbinidæ* and *Trochidæ*.
71. George J. Streator, Garrettsville, Ohio. *Corbiculidæ*.
72. J. B. Quintard, Silver Lake, Kan. *Kansas Mollusca*.
73. Henry Prime, Huntington, N. Y. *Geographical Distribution of Land Shells*.
74. G. E. Manigault, M. D., Charleston, S. C.
75. Henry Moore, Columbus, Ohio. *General Conchology*.
76. J. B. Upson, Rockford, Ill.
77. H. K. Morrell, Gardiner, Me. *Unionidæ*.
-

Members desiring to propose applicants for membership should address the Secretary, Charles W. Johnson, Wagner Free Institute of Science, Philadelphia, Pa.

Dr. G. E. Manigault is connected with the Museum of Natural History, Charleston, S. C.

Prof. James H. Morrison, of the Virginia Military Institute, Lexington, Va., is taking an active interest in the Association and has already proposed a number of valuable members.

H. K. Morrell, of Gardiner, Me., writes: "I am simply a collector of shells and student of conchology." The Association is intended to associate collectors as well as students and scientists. By directing the attention of collectors to some special group or family, much valuable material can be put together. In fact, it is astonishing how rapidly specimens are added, when the attention is concentrated on a small group. It is impossible for anyone, unless he be a millionaire, to attempt to make a general collection of shells, which requires time, space and money; but, if each member would devote his time to making a fine special collection, and incidentally a representative generic collection, showing the different leading forms, much better results will be accomplished.

Rev. John Walton has changed his address from Lakeside, N. Y., to Pittsford, N. Y. Members will please take notice.

F. C. Browne, Framingham, Mass., writes: "I am afraid the members are not going to get the benefit they might, if they would correspond." It is one of the objects of the Association to induce correspondence between the members, especially between members interested in the same or analogous subjects. Comparison of views, exchanges of specimens, etc., will add to our stock of knowledge.

M. M. Shepman of Rhoon, near Rotterdam, Holland, writes: "I would like to have some information about the American Association of Conchologists. You will oblige me with a copy of the rules." The Secretary has supplied him with the information.

It may soon be possible for the Association to prepare a complete list of North American shells. Several of the members have selected the mollusca of special districts for study, and in time it is expected that the whole continent will be covered. As soon as that point is reached, each member might furnish a list of the mollusca of his district, with authentic localities and by consolidating the lists, an Association check list could be prepared. So far, the following districts are covered: Rhode Island, H. F. Carpenter; Wisconsin, Geo. T. Marston; Michigan, M. L. Leach, M. D.; Kansas, J. B. Quintard; West Coast, Prof. Josiah Keep, Miss Ida M. Shepard, W. J. Raymond and G. W. Lichtenthaler; North West Atlantic, Sanderson Smith; Vancouver Province, Geo. W. Taylor; Besides these the Land and Fresh Water shells of North America are being studied by H. A. Pilsbry, F. R. Latchford, Geo. W. Harper, Bryant Walker, J. A. Singley, Rev. W. M. Beauchamp, Wm. G. Mazyek, D. V. Sterki, W. W. Westgate, U. S. Grant, W. G. Binney, and W. S. Strode, M. D.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

FAMILY UNIONIDÆ.

191.—*Margaritana marginata*, Say.

Syns.:

Alasmodonta marginata, Say, Barnes, Con. Stimp. Adams.

Unio varicosa, Lam.

Mya rugulosa, Wood.

Alasmodon marginata, DeKay, Gould.

Margaritana marginata, Lea.

Shell ovate, thin, wedge-shaped, gaping widely behind; beaks small, elevated; surface wrinkled posteriorly; epidermis olivaceous, radiated with dark green; teeth, one in each valve, small, compressed, directed forwards; nacre bluish-white with a chalky margin. Length, 2 inches; height, $1\frac{1}{10}$ inch; breadth, $\frac{9}{10}$ inch.

This species is not all common in New England, and is found very sparingly in the Blackstone River, just above the Tin Bridge in Central Falls.

192.—*Margaritana undulata*, Say.

Syns.:

Unio undulatus, Say.

Alasmodonta undulata, Barnes, Adams.

Mya undulata, Wood.

Unio lirans, Valenc.

Strophitus sculptilis, Stimp.

Shell short, tumid, angular behind and widely gaping; breaks prominent, with three or four undulations upon them; epidermis shining, of a dark olive color, rayed with alternating yellowish and dark bands; nacre on the anterior half, thickened, opaque, white; on the posterior half, thin, translucent and of a silvery luster, showing through it the exterior radiations; hinge supported on a very strong rib; the left tooth erect, conical and striated above; the left tooth erect, and produced backwards under the ligament. Length, 2 inches; height, $1\frac{2}{5}$ inch; breadth, 1 inch. It is more common than *marginata*, and is found in the Blackstone River and in most of our larger ponds.

(*To be continued.*)

GENERAL NOTES.

SPECIES DETERMINED. From W. J. Raymond, Oakland, Cal. 1, *Olivella floralia* DuRoi, West Indies; 2, *O. nivea* Gmelin, West Indies; 4, *Patella confusa* Gmel., West Indies.—C. W. J.

LIMNÆA COLUMELLA Say. Not found in recent years near Philadelphia, is quite abundant in ponds along the line of the Pennsylvania Railroad near Bonnaffon, Philadelphia.—Ed.

NATICA WANTED. The undersigned wishes to buy, or obtain in exchange, specimens of the genus *Natica*. John L. Ogden, 72nd st. and Greenway ave., Philadelphia.

HELIX HORTENSIS Mull. The uniform lemon-yellow form has been found by Dr. Benjamin Sharp in the town of Nantucket, Nantucket Island.—*Ed.*

PUBLICATIONS RECEIVED.

A NEW SPECIES OF FRESH-WATER MOLLUSK, by B. Shimek (Ex. Bull. Lab. Nat. Hist. State Univ. of Iowa, vol. 1, p. 214). A species of *Ancylus* with very strongly recurved apex is described and figured by Prof. Shimek in this paper as *A. obliquus*.¹ The right side of the shell is slightly incurved or straight. The largest specimen measured $3\frac{1}{2}$ mm. in length, 1.8 in width, 1.5 mm. high. It occurs not uncommonly about 5 miles east of Lincoln, Nebraska, in Dead Man's Run, a streamlet with numerous pond-like enlargements. Specimens were found by Mr. Shimek at all seasons of the year, adhering to the shells of *Anodonta plana*, sticks, leaves, etc.

This same form, or a very similar one, has been found, by the writer, back of Rock Island, Illinois, in a certain swamp well known to those bare-footed urchins who offer pond-lilies at "only five cents er bunch, Mister" on the streets of the "Three Cities."²

Certain indications led me at the time of finding this shell to refer it to *Gundlachia* instead of *Ancylus*; and it may be worth while to follow this clew further. If my supposition proves to be correct, *Gundlachia* will furnish the most extraordinary case of dimorphism known among our American mollusks.—*H. A. Pilsbry.*

CATALOGUE OF NORTH AMERICAN SHELLS collected by Henry Hemphill. This pamphlet catalogues 1763 species and varieties of land and marine shells collected by the author, including a majority of the species found on the Californian and Floridan coasts.

LIST OF THE MOLLUSKS OF OTTAWA, as recorded in the *Transactions of the Ottawa Field-Naturalists Club* up to April 1st, 1890, is given in the *Ottawa Naturalist*, April, 1890. It comprises 127 species, giving that part of Canada quite a varied fauna, richest in *Cyrenidæ* (14 species), *Unionidæ* (27 species), and *Limnæidæ*. From F. R. Latchford.—*H. A. P.*

LES MOLLUSQUES DE LA PROVINCE DE QUEBEC, by M. L'abbé Provancher (in *Le Naturaliste Canadien*, March, 1890). Includes the marine, land and fresh-water forms.

¹ This name is three times preoccupied in *Ancylus*. If the species proves really distinct from *Gundlachia Meekiana* it might be called *Ancylus Shimekii*.

² Davenport, Rock Island and Moline are locally known by this name.

THE NAUTILUS.

VOL. IV.

SEPTEMBER, 1890.

No. 5.

REMARKS ON CERTAIN GONIOBASES.

BY H. A. PILSBRY.

The typical *Goniobasis pleuristriatus* of Say is a shell of the general form of *Gon. virginica*; and like the variety *multilineata* of that shell, it is encircled by numerous fine raised striæ. It has been collected in a number of the small rivers in Texas north of the Rio Grande, the northermost being that beautiful stream, the Guadaloup River, in Comal County. Thomas Say described the shell in the *New Harmony Disseminator* in 1829,—Say at that time being still connected with that luckless company of socialists at New Harmony, Indiana.

In the Comal Creek, at the German colony of New Braunfels, the the writer found very numerous specimens of a variety which wholly lacks spiral striæ, and has low, subobsolete longitudinal folds. There is a single carina on the whorls of the spire. Specimens of this variety were distributed by me several years ago under the name of "*Goniobasis comalensis*;" which name I now propose to use for this variety. In the absence of a figure, I will be glad to send specimens to any student of the Melanians who will apply to me. My friend, Mr. J. A. Singley, has also collected specimens at New Braunfels. This melanian is notable for the fact that its range is wholly sundered from the rest of the family by the numerous rivers of central and eastern Texas, draining into the Gulf, and without a single species of the family Strepomatidæ. The great extension of the Gulf during past ages, up the Mississippi valley, shows the Texan

region to have been still more separated formerly from Tennessee, the present headquarters of the American Melanians.

In this connection I might mention a matter to which Professor Theodore Gill of Washington directed my attention during a recent conversation; namely, whether the Californian Melanians do not belong to the old-world family *Melaniidae* instead of to the American group *Strepomatidae* (= *Ceriphasiidae* Gill, *Pleuroceridae* Fisher). I have found that certain features of the dentition of *G. plicifera*—the *trilobate* base of the rhachidian tooth—are more similar to the *Melaniidae* than to the East American forms. I would, therefore, ask some western naturalist to observe whether the edge of the mantle be fringed or plain; or, if any one has alcoholic or even freshly dried specimens, and will communicate a few to me, I will announce the result of an examination through the pages of the NAUTILUS.

A FEW "NEVERS" FOR CONCHOLOGISTS.

BY DR. V. STERKI.

One or another of the following hints may be of service to younger students of Conchology, and also the older ones possibly will read them:—

Never dry your specimens in too great heat; they should be dried, but not fried. Not only the shell is liable to change color and to become utterly fragile, but also the "soft parts" are so changed as to be unfit for microscopic examination.

Never kill and dry them when the animals are still active: in this way the aperture may be filled up in a way that it is very difficult or even impossible to examine it; this is especially of importance in Pupidae and other groups with lamellæ etc., in the aperture. When the specimens are kept dry in a box for a few days, they will retire deep enough in the shell to leave the aperture free.

Never pack up specimens without adding a label with the habitat and as much notice about its nature as possible. Without that, they may be worthless or even worse!—When Shuttleworth, that eminent English Conchologist, had died at Berne, Switzerland, the contents of several boxes of his valuable collections had to be destroyed (not thrown away!), because there were no labels with them, and the catalogues not to be found.

Never forward a lot of shells for examination, or in exchange, unless there be at least one mature specimen in good condition among them—if you have any such, of course. This is again especially of importance *e. g.* with Pupidae where the lamellæ are of principal interest.

Never pack up small shells in a vial to be sent away unless you secure them in place with some cotton; the constant tossing and jarring cannot but damage them more or less.

Never pack a number of vials together in a box unless each one is wrapped in paper. In several instances I have received vials crushed to pieces and the contents scattered around.

Never oil your shells so that they soil or stick to anything they touch! not to speak of their entirely altered appearance. Very little oiling generally is needed—(by this I certainly do not mean Pupa, Vertigo, etc.!)

Never cork a vial containing living mollusca or such not thoroughly dried; not only a very offensive odor will develop, but generally the shells will be altered in appearance, color and consistency.

A NEW VARIETY OF *HELIX CARPENTERI* FROM SOUTHERN CALIFORNIA.

BY DR. LORENZO G. YATES, F. L. S., SANTA BARBARA, CAL.

The typical form of *Helix* (*Arionta*) *Carpenteri*, Newc. seems to belong to the peninsula of Lower California, although heretofore reported from "San Diego" and "Tulare Valley" California, and I have specimens of a variety which I collected in Napa County many years ago.

I now have a variety from the desert region near Indio, San Bernardino County, California, collected by Stephen Bowers, Ph. D.

These specimens agree with Dr. Newcomb's original description except in that, they do *not* show the "very minute spiral striations," which may however be consequent upon their dead and bleached condition.

They further differ in having an *entire* circular aperture instead of "aperture circular, with terminations approximating" as described by Newcomb.

Helix Carpenteri is a species which from its native peculiarities is well adapted to inhabit the desert regions, and continue to exist where the majority of our helicoid shells would be unable to retain a foothold.

Dr. Bowers writes me that he "found these shells on the south side of the valley among granite talus, and nowhere else, and these in a fossil state," but judging from the appearance of some of the specimens it is probable that living shells may still be found in the vicinity; but whether this variety represents the ancestral form of the more recent type, or is a local deviation arising from peculiarities of environment cannot be satisfactorily determined without further investigation of the locality.

While writing the above I found some other species of semi-fossil mollusca, which were collected in the same locality some time ago, by an enthusiastic young naturalist, whom I have since learned, lost his life in the desert regions of Lower California, thus adding one more martyr to the cause of science. He sent these shells to me for determination, and not having heard from him since, I will give the determination of their species in a future number of the NAUTILUS.

PRELIMINARY NOTICES OF NEW AMNICOLIDÆ.

BY H. A. PILSBRY.

Cochliopa Tryoniana Pilsbry.

A more depressed shell than *C. Rowelli* (the only other described species), broader, *with the base rounded, not carinated around the umbilicus*. Whorls $3\frac{1}{2}$, convex, rather obsoletely spirally striated; color greenish-gray. Umbilicus minute. Aperture very oblique.

Alt. $3\frac{1}{2}$, diam. 4 mill.; oblique alt. of aperture $2\frac{2}{3}$, width 2 mill.

Habitat, Polvon, Nicaragua.

Amnicola Sheldoni Pilsbry.

Shell rather elongated, solid, thick, light gray: subimperforate. Whorls four to five, slightly convex, somewhat flattened above, lightly striate transversely: slightly impressed below the shallow sutures. Apex obtuse. Aperture small, ovate, slightly narrowed

and angled above, rounded below, flattened on parietal margin. Peristome continuous, not sinuous.

Alt. 3 to 3.5 mm., diam. 2 to 2.25 mm.

Habitat, Lake Michigan, at Racine, Wis., in 30 fathoms.

The shallow sutures and heavy texture are the more prominent characters of this shell. In these points a resemblance to *Hydrobia ulva* and other species of that group may be traced. From *Amnicola lustrica* the more flattened whorls at once separate this form.

We are indebted to Dr. P. R. Hoy of Racine, Wis. for numerous specimens. The species is named in honor of the late PROFESSOR D. S. SHELTON of Davenport, Iowa,—one of the pioneer naturalists of the Mississippi Valley.

***Amnicola lustrica* Pilsbry.**

Shell slender, elevated, thin, translucent, wax-colored or slightly brownish; whorls five, well rounded; sutures deep; aperture ovate, narrowed and slightly angled above; peristome entire, adherent to body for a short distance above the narrow umbilicus.

Alt. 4, diam. 2 to 2½ mill.

Habitat, New York to Illinois and Minnesota.

A species of the Lake drainage.

Say's *Paludina lustrica* has been referred by Haldeman and Tryon to *Pomatiopsis lapidaria*. Binney also places it in *Pomatiopsis*, and the original of his fig. 189¹ is certainly an immature *P. lapidaria*, as I know by an examination Say's of original type. The name *lustrica* has, however, been applied by some collectors to the present species; and while we must write *lustrica* Say a synonym of *P. lapidaria*, the name may also stand in *Amnicola* for the well known form described above.

The species is variable in form as the figures² show. *It is narrower than any other Amnicola*, but wider than *Bythinella Nickliniana*. In size and color, *Bythinella obtusa* is similar; but the acute apex of *lustrica* will separate it from that blunt little species.

The animal and dentition are similar to *A. limosa*.

¹ Land and Fresh Water Shells, N. A. pt. II,

² It is figured in a work now in preparation on the Mollusks of the Northern U. S.

CYPRÆA SPADICEA.

BY LORENZO G. YATES.

In the July, No. of THE NAUTILUS, Miss Ida M. Shepard of Long Beach, Cal., noted the finding of *Cypræa (Luponia) spadicea* eleven miles north of that place, and questions "How much farther north they are found?"

This somewhat rare and very handsome shell is found in the Santa Barbara Channel. I found three live shells in one day recently, and a friend found as many as seventy-five fine living specimens in one day, some fifteen or eighteen miles distant from Santa Barbara, northwest, and what was of more interest to me, he generously divided his find.

In preparing a List of the Mollusca of Santa Barbara County for publication, I was surprised at the large number of species, whose northern, or southern limit is the Santa Barbara Channel, besides a number of species which have not been noted from any other locality on the west coast, some of them being restricted to the channel and its islands.

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

AUGUST 26, 1890.

Since last announcement the following new members have been enrolled in the Association:

- No. 78. Chas. E. Beecher, Ph. D., New Haven, Conn. *Palaeozoic Mollusca.*
 79. Jerome Trombley, Petersburg, Mich. *American Land Shells.*
 80. W. G. Binney, Burlington, N. J. *American Land Shells.*
 81. W. Newcomb, Ithaca, N. Y. *General Conchology.*
 82. F. A. Sampson, Sedalia, Mo.
 83. C. Antoinette Shepard, New Britain, Conn. *The Uses of Shells.*
 84. Laura J. F. Hecox, Santa Cruz, Cal.
 85. J. R. Mead, Wichita, Kan. *Unionidae.*
 86. Arthur F. Gray, Yonkers, N. Y.
 87. S. M. Luther, Garrettsville, O. *Helicidae.*

88. Dr. Stephen Bowers, Ventura, Cal.
89. E. H. Harn, Blairsville, Pa. *Geographical Distribution and Specific variation in Land Shells.*
90. Prof. Leslie A. Lee, Brunswick, Me. *Arctic Moll. and Post-pliocene Fossils of No. Latitudes.*
91. O. A. Crandall, Sedalia, Mo. *Physa.*
92. Philip E. Marsh, Aledo, Ill. *No. American Helicidæ.*
93. Prof. Edw. W. Claypole, Akron, O. *Palaeozoic Mollusca.*
94. E. Leslie, Hamilton, Ont.
95. Mrs. S. H. Young, Long Beach, Cal.
96. L'Abbé Provancher, Cap Rouge, Quebec. *Mollusca of Province of Quebec.*
97. A. Schlehenreid, New York, N. Y.

In the course of the next ten days, a complete printed list of all the members of the Association, together with their exact addresses, memorandum of subjects chosen for special study etc. will be issued, and a copy sent to each member for his own use.

We are please to note the enrollment of two such distinguished Conchological veterans as Dr. Newcomb and Wm. G. Binney. Mr. Binney writes that "it will be a pleasure to me to assist all who are studying mollusks, but I fear indifferent health will prevent my being of much use to them." Dr. Newcomb writes in the same kind spirit, desiring to aid younger students in their work.

Dr. Newcomb is now 82 years of age—probably the oldest living American Conchologist. He has been a great worker, having collected upon 23 of the West India Islands, in the interior of British Guiana, in Equador and Colombia, Nicaragua, Costa Rica, Honduras, and West Mexico to Panama, in California and on 6 of the Sandwich Island group. His publications are numerous, many papers by him having appeared in the Conchological journals of Europe and America. As he himself writes "I am almost alone; my old friends Agassiz, Gould, the elder Binney, Anthony, Lea, Reeve, Cuming, Swift, Bland, Wheatley and many others have passed away."

O. A. Crandall, Sedalia, Mo. is studying the genus *Physa* and writes as follows. "If the members of the Association will send me specimens of *Physa* from all over the country, I will take it as a favor, besides returning them value in other exchanges."

H. K. Morrell, Gardiner, Me., writes: "By the way I notice that in the last NAUTILUS, Mr. Carpenter speaks doubtfully of pearls

being found in *Margaritana arcuata*. I have a friend who has done quite a business in collecting them from that mussel."

E. H. Harn, Blairsville, Pa. in five years, has found 64 species and varieties of shells in his neighborhood. That is a sample of what can be done by patient search.

Mrs. M. Burton, Williamson University, Cal. sends us a copy of the Weekly Tribune of Los Angeles, Cal. of August 16th, containing an interesting article by Virginia Burton, upon the "Coffee-bean Cowries" of the California Coast (*Trivia Solandri* and *Trivia Californica*.)

Mr. Frank C. Baker, who has been studying at the Academy of Natural Sciences of Philadelphia for a year past, and who was one of the members of the expedition sent by the Academy to Southern Mexico, has accepted a position with Prof. Henry Ward of Rochester, New York, in his department of Invertebrates. Mr. Baker leaves many warm friends in Philadelphia, where he will be missed from the circle of conchologists as well for his kindly personal qualities as for his recognized ability in the study of Mollusks.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

FAMILY UNIONIDÆ.

Genus *Anodonta*, Cuvier.

Shell transversely elongated, inequilateral, thin, toothless.

To distinguish instantly between the three genera, *Unio*, *Margaritana* and *Anodonta*, it is only necessary to examine the hinge. *Unio* has cardinal and lateral teeth in each valve; *Margaritana* has cardinal teeth, but no laterals, while *Anodonta* has no teeth, the valves being held together only by the ligament.

There are two hundred species of *Anodonta*, distributed world wide. Two of these are known to inhabit R. I., and a third may possibly be found within its limits.

193.—*Anodonta cataracta*, Say.

Syns.:

Anodonta fluviatilis, Lea, Gould, Stimp.

Mytilus illicus, Solander.

Shell thin, inflated, transversely sub-oval, fragile; basal margin curved; hinge margin straight; epidermis smooth, excepting at the

posterior and upper portion, where it is loosely wrinkled; color deep grass green, dusky above and behind, radiated; nacre silvery or bluish-white, margin greenish. Length given by authors, $4\frac{1}{2}$ inches; height, $2\frac{3}{4}$ inches; breadth, $1\frac{1}{2}$ inch.

When shells are figured in books the specimens selected for the purpose are always the largest and finest ones to be had. When Say described this species in 1816, he gave its length as $2\frac{1}{2}$ inches. Gould gives it $4\frac{1}{2}$ inches, but I have frequently seen specimens over five inches in length and have *one* myself six inches long. Gould considers the species very rare, found only in ponds in the central and western parts of Mass., but Perkins finds it near New Haven, in Conn., and we have at least two localities in R. I., and one in Attleboro, near the line.

194.—*Anodonta implicata*, Say.

Shell transversely oblong, almost as broad as high, very variable in proportions, thick and strong in some, thin and fragile in others; epidermis yellowish olive (darker above and behind), with dark brown zones; young shells grass green, resembling *A. cataracta*, middle aged resembling *U. radiata*; nacre silvery white until after the middle age, when it becomes flesh colored or salmon. Length about four inches, height, $2\frac{1}{4}$ inches; breadth 2 inches. Gould says it inhabits ponds in Essex and Middlesex counties in Mass., and has been found in Maine. Whether it occurs southward or not is uncertain. We find them in R. I., extremely common in all our ponds and rivers.

195.—*Anodonta undulata*, Say.

Shell transversely oval, thick; beaks prominent, the points in contact, and when not eroded they exhibit four or five undulations upon them; epidermis dark brown, radiated; hinge with a vestige of a tooth, this peculiarity forming a connecting link between *Anodonta* and *Margaritana*; nacre salmon colored, granulated in the centre, bluish-white outside the pallial impression, with a broad margin of olive. Length, $3\frac{1}{2}$ inches; height, 2 inches; breadth, $1\frac{1}{2}$ inch.

The locality given by Gould is the Blackstone River and its tributaries in Mass., and as this river flows through several miles of R. I. territory, I include it here although no specimens have been obtained within our limits.

FAMILY NUCULIDÆ.

The Nuculidæ or Nut shells are small, pearly, angular shells. They commenced in the Lower Silurian and are abundant in all the various formations since. Most of genera belonging to this family are known only as fossils. Three of the living genera, *Nucula*, *Leda* and *Yoldia* inhabit New Eng. and two are represented in R. I.

Genus *Nucula*, Lamarek, 1799.

There are about fifty species, inhabiting all parts of the world, most of which are found in deep water. Five species are in New Eng. two of which probably inhabit R. I.

196.—*Nucula delphinodonta*, Mighels.

Syn.:

Nucula corticata, Holboll., Möller.

Shell small, obliquely triangular, very broad; beaks nearly at the posterior end, elevated and tumid; hinge with three posterior and seven anterior sharp elongated teeth; surface with coarse lines of growth; epidermis olivaceous. Length $1\frac{1}{8}$, height $1\frac{1}{10}$, breadth $1\frac{1}{2}$ of an inch.

This species was found in large numbers in the stomachs of Cod-fish, taken in Casco Bay, and described by Dr. Mighels in Journ. Bost. Soc. Nat. Hist. iv, 1842. It inhabits soft mud from ten to one hundred fathoms water from Cape Cod to Greenland, and is included among the shells of R. I. only on the authority of Stimpson, who says it inhabits the whole coast, laminarian region, and of Prof. Verrill who found it in twenty-nine fathoms, east of Block Island and off Gay Head.

197.—*Nucula proxima*, Say.

Shell small, thick and solid, very oblique, ovate-triangular; beaks elevated, inclined forwards; surface crossed by minute lines, both radiating and concentric; epidermis light olive with darker zones; interior lined with pearly naere; margins finely crenulated; hinge with twelve teeth before the beaks and eighteen behind them. Length $2\frac{9}{10}$, height $2\frac{7}{10}$, breadth $\frac{1}{4}$ inch.

Described by Thos. Say in Journ. Ac. Nat. Sc. Phila. 11, 270, 1822. It is frequently taken from the stomachs of fishes. Its habitat is soft mud below low water, but it has been collected on the shore at Martha's Vinyard. Distribution, from South Carolina to Gulf of St. Lawrence. It is very abundant in our bay, in mud, off Rumstick, near the mouth of Warren River, where every throw of the dredge will bring up hundreds of specimens.

Genus *Leda*, Schum., 1817.

This genus contains eighty species, four of which inhabit New England and farther north. I am not aware that any species of the genus inhabits R. I. although Prof. Verrill says in speaking of *Leda tenuisulcata*, Stimpson, it inhabits from R. I. to Gulf of St. Lawrence.

Genus *Yoldia*, Möller, 1832.

Five species of these peculiar shaped and highly polished shells inhabit New Eng. one of which is found not living, but in a semi-fossilized condition in Maine.

(*To be continued.*)

GENERAL NOTES.

HALIOTIS RUFESCENS, Swains. In the last number of the *Manual of Conchology* Mr. Pilsbry gives the range of *Haliotis rufescens*, Swainson, "From Mendocino Co. to San Nicholas Island California." In 1874 or 1875 I collected several very fine living specimens, at extreme low tide on rocks near the mouth of San Tomas River, Lower California. This extends its range fully two hundred miles south of San Nicholas Island. I may also add, that *Haliotis cracherodii*, Leach, ranges two or three hundred miles south of San Tomas River.—*Henry Hemphill, San Diego, Cal.*

HELIX HÆMASTOMA VAR. *CONCOLOR*. Among the hundreds of specimens of the *hæmastoma* which I have seen, I never found one

without white zones or bands, until a short time ago some were sent me of a rich chestnut color all over. The lip is pink, as usual. This color-pattern is so conspicuous that it may deserve a varietal name.—*H. A. P.*

CONSTRUCTED OR SECRETED? In the August number of the NAUTILUS Mr. Henry Hemphill makes the following statement: "It is well known that all shell-bearing Mollusks construct their shells, in obedience to the laws of their constitutional characteristics and the environment, among which I include affinity of matter and mechanical skill, the latter a faculty possessed to a greater or less degree by all animals."

In my simplicity I had supposed that shells were secreted, as bone is secreted, not constructed. By whom is it "well known" that they are constructed, and how do they know it?

I ask these questions not in a spirit of criticism, but to draw out facts. Mr. Hemphill will help to make the NAUTILUS interesting, if he will give us in its pages a succinct statement of the leading facts on which his theory is based.—*M. L. Leach.*

OFFERED Land and fresh water shells of this locality for shells of other localities. G. M. Leslie, 69 Main St., W. Hamilton, Ont., Canada.

BULIMULUS IN TEXAS. While in the field on the State Geological Survey last week I saw the white *Bulimulus* with yellowish wash (*Bulimulus* var. *Mooreanus*) sticking to dry dead woods in a blazing sun with temperature up to 95° in the shade. This was the only colony seen in ten days riding. Vegetation is very much parched in the region from 90 days drought.—*G. H. Ragsdale Gainesville, Texas, August, 1890.*

SPECIES DETERMINED. From L'abbe Provancher, Cap-Rouge, Quebec, Can.—Nos. 1, 2, 3, 4, *Bulimulus exilis* Gmel. Barbadoes, Dominica, St. Lucia. 5 *B. vincentinus* Pfr. Trinidad. 6 *B. elongatus* Bolt. Trinidad. 7 *Goniobasis livescens* Menke, Kankakee R. Ill. 8 *Paludina integra* Say, Fox R. Ill. 9 *Pleurocera subulare* Lea, Fox R. 10 *Paludina lineata* Val. Fox R. 11 *Cardium citiare* Gmel. Europe. 12 *Cytherea convexa* Say, Magdalen Islands Gulf of St. Lawrence.—*C. W. J.*

THE NAUTILUS.

VOL. IV.

OCTOBER, 1890.

No. 6.

CRITICAL NOTES ON THE BULIMULI OF FLORIDA.

BY BERLIN H. WRIGHT, LAKE HELEN, FLA.

Bulimulus Dormani W. G. B. var *albida* Wright.

That this is a good variety would appear from the following facts : It is *never found associated with the typical*. I have seen trees literally loaded with the typical *B. Dormani*, where it would have been possible to have secured thousands of specimens in a few hours time and have taken as many as five hundred in a day, but never have been able to discover any tendency to change of any of the characters. At one time I had over *one thousand* living, full grown specimens spread out in a large box and with the closest scrutiny no freaks were seen. We liberated nearly all of them subsequently.

In a dense hammock well isolated from any similar lands and fully a dozen miles from any locality where the typical *B. Dormani* is to be found, the *pure white* shell occurs. It is not plentiful, but always *spotless*. In form it does not seem to differ from the typical.

Bulimulus Hemphilli Wright.

In the hammock lands located upon the narrow strip of land lying between Mosquito Lagoon and the Atlantic Ocean, there is another form of *Bulimulus* found. This is shorter, its whorls more rounded and is thinner than *B. Dormani*. This shell was discovered by Mr. Henry Hemphill of San Diego, Cal. in 1884 and Dr. Binney, judging from the few *dead* specimens in hand, pronounced it a var. of *B. Floridanus* Pfr. Subsequently I found a fair number of living specimens and became convinced that it was a good species and

described it under the name of *Bulimulus Hemphilli* in the West American Scientist of April, 1889.

During the present season I have had the opportunity to compare the animals, eggs and habits with typical *B. Dormani* and no doubt is left as to its being distinct from it. But as to its relation to *B. Floridanus* I am not able to say so positively, never having seen this *unknown* shell. However I claim the following differences appear from comparison with the published figure and description. See Binney's American Land Shells, p. 407-8, fig. 448.

B. FLORIDANUS Pfr.

1. Perforate.
2. Narrow.
3. Grayish green.
4. Variegated-white-streaks and spots.
5. Spire acute, elongate.
6. Aperture $\frac{2}{3}$ length of shell.
7. Subangulated below.
8. Attenuated at base.
9. Whorls $6\frac{1}{2}$.
10. Rather smooth.

B. HEMPHILLI Wright.

1. Imperforate.
2. Wide.
3. Amber dull lead color.
4. Obscure brownish red bands below.
5. Spire blunt, short.
6. Aperture $\frac{2}{3}$ length of shell.
7. Base uniformly and gracefully rounded.
8. Expanded at base.
9. Whorls 5.
10. Marked by coarse lines of growth.

I call this quite a "general difference," and from which I believed myself justifiable in giving to it a name, especially after receiving the following letter from Dr. Binney:

August 16. 1888. "I find the jaw and lingual dentition to be same as in *B. nitelinus* Rv.—*B. serperastrus* Say." August 26, 1888. "I am aware that said figure (449) does not agree with the carinated body whorl of *B. Floridanus*, but in the present state of our ignorance of the range of variation of these *Bulimi*, who knows?"

"It would be well for you to describe your shell as new, leaving to the future the decision of its identity with *some other* W. I. or *Spanish Main species*. To us Americans, it is *surely new*."

I am thus specific about this because Dr. Binney has subsequently (see last Ed. of Manual of American Land Shells) placed *B. Hemphilli* Wright, as a synonym of *B. Floridanus*. Why he should do so, after the above declaration, is strange to me, unless he is naturally too conservative.

Who has seen it—*Bulimulus Floridanus* Pfr.?

After seven years spent in Florida, travelling about much and always keeping a sharp look-out for shells and plants, I have never

yet found anything bearing any resemblance to this shell. True, it may exist upon some of the Keys, but diligent inquiry among correspondents fails to bring out any information as to its whereabouts. Does any reader of THE NAUTILUS know of any specimen having been found? Has any one ever seen it? Is there a specimen in the United States? If no one has any knowledge of the shell's existence in Florida, is it not time the name was dropped and treated as a lost species? Many sharp collectors and students have scoured the wilds of Florida very thoroughly and if it is really here its presence should have been known before this.

Any one possessing any information upon this matter will confer a great favor by addressing the writer.

A NEW VARIETY OF HELIX.

BY LORENZO G. YATES.¹

Helix (*Arionta*) *Carpenteri*, Newc.

Variety *INDIOENSIS*, L. G. Yates.

Shell umbilicated, rounded conical, apex obtuse, obscurely marked with one brown band, lines of growth well defined; whorls 5, rounded; suture well marked; aperture circular, entire; peristome slightly expanded, except at the columella, where it is broadly expanded in a line nearly parallel with the vertical axis.

Greater diameter 18 mm. height 12 mm.

Habitat, near Indio, San Bernardino County, California, Collector, Stephen Bowers.

NOTICES OF NEW AMNICOLIDÆ.

BY H. A. PILSBRY.

Bythinella Hemphilli Pilsbry.

Shell minute, very slender, about the shape of *Carychium exiguum* Say. Apex obtuse, whorls 5, convex, the last imperforate. Aperture

¹ By a curious oversight the following was omitted from Dr. Yates' paper in the September *Nautilus*.

ovate, about one-third the length of the entire shell; peristome continuous, its plane oblique to the axis of the shell, the base of the lip being advanced. Color, corneous, often encrusted with a black ferruginous deposit. Alt. 2.4, diam. 1 mm.

The types were collected by Henry Hemphill near Kentucky Ferry, Snake River, Washington. The species is more nearly allied to *B. Aldrichi* Call, then to our other forms, but is far more slender than any *Bythinella* yet made known to us from North America. The plane of the peristome slants forward toward the base, as in the species of *Pleurocera*, but the lip is not sinuous. This peculiarity alone will separate *B. Hemphilli* from all other species.

***Bythinella brevissima* Pilsbry.**

Shell narrowly umbilicated, pupiform, composed of 4 or 4½ very convex, rounded whorls, the first two increasing rapidly in width, the last two more equal in width. Aperture a little over one-third the length of shell: oval: the columellar side a little more flattened than the outer; peristome simple, continuous, in contact with the body-whorl at the upper part, but not modified or flattened by that contact. Umbilicus rather large. Surface slightly wrinkled longitudinally. Alt. 2.8, diam. 1.8 mill.

This species was collected by John H. Campbell, Esq, in Haulover Canal, at the head of Indian River, Florida. It was associated with *Byth. æquicostata*, *Hydrobia Wetherbyi*, *Goniobasis papillosa*, *Planorbis scalaris*, *Physa pomilia* and *Vivipara Georgiana*.

The shell seems most nearly allied to *B. obtusa* and *Aldrichi*; having the same *truncated* appearance caused by the depressed form of the earlier whorls, while the last two form a rather cylindrical body. The whorls are more convex than in *B. obtusa* and the umbilicus far larger, it being scarcely obvious in *B. obtusa*. *B. Aldrichi* is a smaller species, with different aperture.

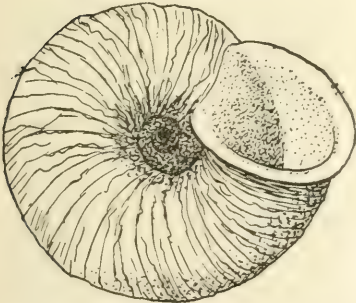
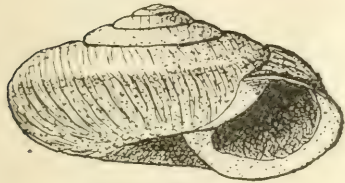
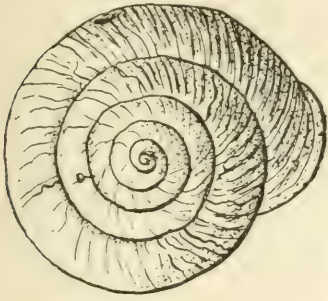
A NEW SPECIES OF NANINA.

BY H. A. PILSBRY.

***Nanina Ruschenbergeri* Pilsbry.**

Shell large, depressed, thick and solid, rudely striate, deeply and perspectively umbilicated.

Solid and strong, opaque. The specimens are dead, lusterless and destitute of epidermis, of a dirty-white color with either (1) a single narrow peripheral brown girdle, the umbilicus brown in-



side, or (2) a broad brown girdle encircling the middle of the whorl, or (3) the upper surface of the last whorl brown except for a light girdle just above the periphery, below which there is a broad zone, its lower edge fading out on the base, the periphery itself marked by a narrow darker band; in all the forms the umbilicus is brown inside and the whorls of the spire light, the apex somewhat rufous. The surface has very coarse and uneven, irregular, oblique striae above; they are weaker below; and under a lens, close incised spiral lines become visible, making the surface granulate; they are nearly obsolete on the body-whorl, but usually distinct inside the umbilicus and on the earlier whorls. The spire is low, obtuse; sutures deeply impressed. Whorls 6, slowly widening, the inner three somewhat protruding above the outer; the last whorl

very convex above, obsoletely angled on its earlier portion, becoming rounded, shortly but decidedly deflexed in front. Aperture very oblique, rounded-lunate; peristome expanded on its outer margin, reflexed, blunt and much thickened on the basal and columellar margins. Umbilicus deep, permitting one to see to the apex, and funnel-shaped.

Alt. 22, greater diam. 42, lesser 37 mm.; width of umbilicus 8 mm.; oblique alt. of mouth (meas. outside perist.) 21, width 21 mm.

Another specimen measures: Alt. 22, diam. 45 mm.

Habitat, Liu-Kiu Is. (Dr. Ruschenberger.)

This is a very solid, heavy form, apparently belonging to the group of *H. pallasiana* Pfr. but very different from that species in its much more convex whorls, deeper suture, more broadly expanded umbilicus, and in the rounded body-whorl, the earlier part of which is very acutely carinated in *H. pallasiana*. There are four specimens before me, one of them about half grown, the others adults. The young shell is very obtusely angled at the periphery; the striae are minutely granulated. The embryonic shell is large, about one-fifth the diam. of the adult, composed of about $2\frac{1}{2}$ whorls, of which the outer $1\frac{1}{2}$ are finely, distinctly granulate, the inner ones having low, curved, radiating little folds. The termination of the embryonic shell is marked by a distinct line.

EASTERN NEW YORK NOTES.

BY W. S. TEATOR, UPPER RED HOOK, N. Y.

To our list of mollusca inhabiting this Dutchess County region, Mr. Gilbert van Ingen of Poughkeepsie has recently made some good additions, among them, these: *Patula asteriscus*, *Pupa simplex* and *Zonites internus*.

The first named, *asteriscus*, was discovered under the mould in a swamp near the city. Mr. van Ingen in a letter to me gives the following: "The locality where I found them is known as 'The Glen' at Vassar College. It is a small deep valley worn out by a stream in the hills of drift. Through the center of the narrow strip of level land at the bottom flows the stream, on either side of which is the swamp. The soil is fine black muck and is very wet and cold." But two specimens were found at first, and later two more were taken.

Of *Pupa simplex* about a half dozen were obtained in the same place, under moist leaves.

Zonites internus is one of those which are out of place here so far east, though it has been reported at Albany. Mr. van Ingen found a few live specimens and a number of dead ones on the hills opposite Poughkeepsie during the latter part of last March.

WEST AMERICAN NOTES.

BY C. R. ORCUTT, ORCUTT, CAL.

HALIOTIS RUFESCENS Swains. In the NAUTILUS, iv, 59, Mr. Henry Hemphill cites a Lower Californian locality for this species. I have also found this species at the same point at La Playa de Santo Tomas, Lower California, but have never found it or heard of it at San Diego or at intermediate points. Santo Tomas (*not* San Tomas as Mr. Hemphill writes it) is about 75 miles south of San Diego on the Pacific Coast of the Californian peninsula.

HELIX CARPENTERI, Newcomb. Dr. L. G. Yates (NAUTILUS iv, 51) refers a form of *Helix* from near "Indio, San Bernardino Co., California" to this species. If I remember rightly Dr. Bowers collected these to the south of Indio at the eastern base of the San Jacinto mountain range, in San Diego County, Indio, a station on the S. P. Ry., is also in San Diego County. What I take to be the same shell I have collected in the same region, in Palu canon, along Snow Creek, etc., where the dead or "fossil" shells are often very numerous, but living specimens are correspondingly rare. I believe at the proper season an abundance of living examples might be obtained among the rocks, as many of my specimens were plainly recent, and none of those observed, could I describe as in a fossil state. I consider it merely a form of *Helix Traskii* Newcomb, but for that matter *H. Carpenteri* is worthy of no greater consideration.

PHYSA. In my botanical work on the Colorado Desert, San Diego county, California, I have also a good opportunity to study the geology of this interesting and little known region, and the fauna as well as the flora. The millions of fresh water shells scattered over this desert are well known, and a review of the subject of their occurrence there, is now in press. In a recent visit to Yuma, Arizona, and the neighborhood of Ft. Yuma, California, I was enabled to make another interesting observation in relation to their occurrence. At Hanlon's Ferry, a few miles south of Ft. Yuma, on the west bank of the Colorado river, a mining company has erected a tank with a capacity of four thousand gallons. This was put up nearly a year ago (September 1889) and has not since been cleaned out, though nearly emptied twice a week. In this tank I was pleased to find thousands of living *Physas*, some quite large examples. The tank is applied from a 6 inch well, and no shells were

found alive in the Colorado river, only a few hundred feet away. This brings up some interesting questions relating to geographical distribution, of which the writer may treat later.

FOREIGNERS. *Limax maximus* has appeared in San Diego gardens; *Helix nitidus* is also not rare at San Diego, and hundreds were found in the grounds of the University of California, at Berkley, recently. The trunks of several Australian tree ferns have also afforded a *Helix* and one or two slugs new to the writer.

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

OCTOBER 1, 1890.

President, JOHN H. CAMPBELL.

Vice-President, JOHN FORD.

Secretary, CHAS. W. JOHNSON.

Since last announcement the following new members have been enrolled in the Association:

98. Wm. J. Fox, Philadelphia, Pa. *Cerithiidae and shells of New Jersey.*

99. Mrs. E. P. Gaylord, Detroit, Mich. *Cypræidae.*

100. Prof. J. B. Steere, Ann Arbor, Mich.

Several applications are pending. It would facilitate the admission of applicants, if they would refer to some member of the Association, with whom they are acquainted either personally or by correspondence.

Mr. H. A. Pilsbry, Conservator of the Conchological Section of the Academy of Natural Sciences, (at the suggestion of the President of the Association), has commenced the formation of a special exhibit of United States Shells. It is his intention to have every species of mollusk found in the United States, represented in the collection, and if the members of the Association will assist in the work, he will so arrange it, that none but members shall contribute specimens, in order that the collection may be the special exhibit of the American Association of Conchologists. If the idea is successfully carried out, similar collections may be formed in other cities of the United States, so that any person wishing to identify a species, will have the material accessible for reference, to enable him to do

it. The specimens are to be deposited in the Museum of the Academy of Natural Sciences for permanent exhibition. In order that the collection may be a credit to the Association, none but the finest kind of specimens will be accepted and the exact locality of every specimen contributed must be designated. The matter of contributing to the collection, will be, of course, purely voluntary on the part of members, but it is urged upon them to take an interest in the matter, for two reasons, viz: 1st. A complete, special collection of all the mollusca of the United States will be valuable for purposes of reference, identification of species, settlement of disputed nomenclature, classification, and general scientific interest. 2nd. It will be a work, which will redound to the credit of the Association, by showing what the members are capable of doing, when united in gathering material for a great National Collection. The name and address of each donor will be attached to the cards upon which the specimens will be mounted. Members, who are willing to assist the project, will please let the President of the Association know what specimens they can contribute to the collection.

Inquiries have been made by members, as to the best general works of reference in the study of conchology. We would recommend Tryon's Structural and Systematic Conchology, Phila., 1884 and Dr. Paul Fischer's Manuel de Conchyliologie, Paris, 1887. Both of them are invaluable to the student. Any bookseller in America can obtain them.

Mr. Henry Hemphill in his recent Catalogue of North American Shells, suggests some startling changes in the nomenclature of American Helices—mainly in the proposed reduction to varietal rank of a number of species recognized by Mr. Pilsbry and other authorities. In Mr. Pilsbry's subgenus *Polygyra* (including *Polygyra*, *Mesodon*, *Triodopsis* and *Stenotrema*) the following changes would be made if Mr. Hemphill be correct:

Andrewsi, W. G. B.=var. *albolabris*, Say.
appressa, Say=var. *palliata*, Say.
armigera, Ancey=var. *Columbiana*, Lea.
binominata, Tryon=var. *devius*, Gould.
Dorfeuillana, Lea=var. *Texasiana*, Moric.
exoleta, Binn.=var. *albolabris*, Say.

fallax, Say=var. tridentata, Say.
 hirsuta, Say=var. stenotrema, Fér.
 Hopetonensis, Shutt.=var. tridentata, Say.
 inflecta, Say=var. tridentata, Say.
 introferens, Bland=var. tridentata, Say.
 Mooreana, W. G. B.=var. Texasiana, Moric.
 Mullani, Bland=var. devius, Gould.
 Rugeli, Shutt.=var. tridentata, Say.
 Salmonensis, Tryon=var. devius, Gould.
 Sanburni, W. G. B.=var. devius, Gould.
 thyroides, Say=var. albolabris, Say.
 triodontoides, Bland=var. Texasiana, Moric.
 uvulifera, Shutt.=var. auriculata, Say.
 Van Nostrandii, Bland=var. tridentata, Say.
 Wetherbyi, Bland=var. Roemeri, Pfr.

It would be an excellent thing, if those members of the Association, who are interested in American Helices, would communicate with the Secretary, giving their opinion upon the proposed changes of Mr. Hemphill. The Communications would afford a basis for comparing notes and obtaining a consensus of opinion upon the subject, which would make an interesting article in the next number of the NAUTILUS.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER

198.—*Yoldia limatula*, Say., 1831.

Syns.:

Nucula limatula, Say, Gld., DeKay, Con., Sby., Migh., etc.

Leda limatula, Stimp., S. I. Smith.

Yoldia limatula, Modern authors.

Shell transversely ovate, thin and fragile, translucent; posterior end lengthened and narrowed to a rostrum or snout; beaks nearly central, not prominent; surface smooth and shining with minute lines of growth; epidermis very glossy, light green with lighter and

darker radiating zones; interior bluish white, pearly; hinge with eighteen teeth on the posterior, and twenty-two teeth on the anterior side of the beaks. Length two inches, height one inch, breadth one half.

It inhabits from Long Island to Newfoundland fine, soft mud at a depth of from two to ten fathoms. They are very abundant and of large size at Portland, Me., but are much smaller in Rhode Island. The only place where I have been able to dredge them in Narragansett Bay is off Rumstick, at the mouth of Warren River in company with *Nucula proxima*, Say.

(*To be continued.*)

GENERAL NOTES.

James C. Cox, M. D., the well-known Australian Conchologist, has recently published descriptions and figures of *Ancylus Smithi* and *Cypræa Irvineanae*, both from Australia. The latter is said to group with *Cypræa stolidus*, *brevidentata* and *coffea*. (Proc. Linn Soc. N. S. Wales, iv, p, 660, plate xix.)

A fine specimen of the rare *Conus gloria-maris* (of which only about a dozen are known) has been secured by Mr. Hermann Rolle (whose advertisement will be seen in this number.) The specimen is valued by him at \$500.

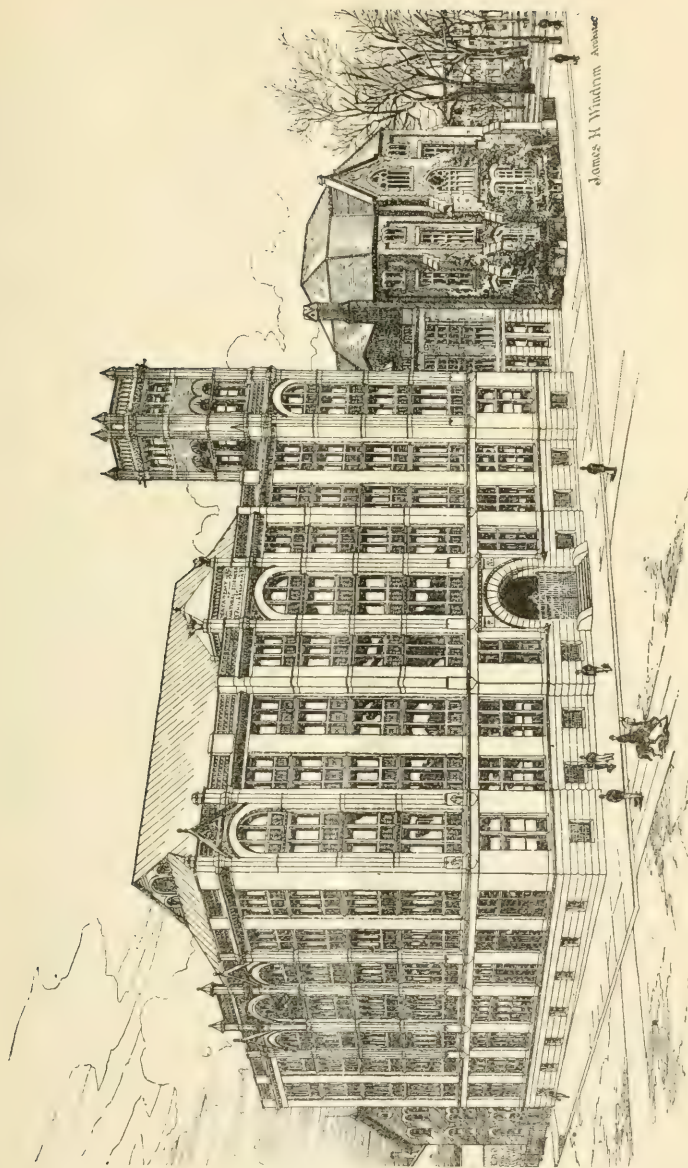
Mr. E. A. Smith of the British Museum has published a very acceptable list of the marine mollusks of the Island of St. Helena in Proc. Zool. Soc. London for 1890. Many new species are described. An unexpectedly large number of West Indian types appear.

CYPRÆA SPADICEA. I noticed that in the July NAUTILUS Miss Ida Shepard tells of finding *Cypræa spadicea* at Longbeach. It has been found here (Santa Barbara) alive, and dead shells are not rare. This is some hundred miles further north than her locality. I have thought that Point Concepcion forty miles above, might be its northern limit, but have no data to prove it. The one captured here, lived two or three days in a bowl of sea water, giving us an opportunity to study its beauties.—*Sarah E. Boyce, Santa Barbara, Cal.*

PUBLICATIONS RECEIVED.

DESCRIPTIONS OF NEW WEST AMERICAN LAND, FRESH-WATER AND MARINE SHELLS, by Robt. E. C. Stearns, Adjunct Curator of the Dept. of Mollusks, U. S. Nat. Mus. (Ex. Proc. U. S. Nat. Mus. xiii, p, 205.) In this excellent paper Dr. Stearns describes *Helix* (*Arionta*) *coloradoensis*, Grand Canon of the Colorado, opposite the Kaibab plateau, elevation of 3,500 ft; *H.* (*Arionta*) *magdalensis*, Magdalena, State of Sonora, Mex., elevation of 1000 ft. above the town; *Holospira semi-sculpta*, State of Chihuahua, Mex.; *H. arizonensis*, Dos Cabezos, Arizona; *Melania* (*Goniobasis*?) *acutofilosa*, Eagle Lake, Cal., a form allied to *G. occata*; *Cyclothyca*, a new subgenus of *Capulus*, with the species *C. corrugata*, West coast of Nicaragua; *Mitra nodocancellata*, Gulf of Cal.; *Venericardia barbarensis*, off Santa Barbara Is., Cal.; *Lucina æquizonata*, same locality; *Venus* (*Chione*) *effeminata*, Panama Bay; *Periploma discus*, San Pedro, Long Beach, etc. *Venericardia borealis* Conr. and *V. ventricosa* Gld., and *Miodon prolongatus* Cpr., are also figured. Of the West Coast Helices Dr. Stearns says: "I agree in the main, if not entirely with Mr. Pilsbry in his remarks as contained in the paragraph under *Lysinoë* in Nomenclature and Check-list of N. A. Land Shells, p, 193, criticising the generic terms, etc., heretofore applied to the helices of the Pacific slope, but I do not perceive the propriety of substituting the generic name *Lysinoë* H. & A. Ad., 1855, any more than *Aglaia* Albers, 1860, for *Arionta* Leach, 1820. As for *Helminthoglypta*, *Micrarionta*, *Euparypha* etc., as applied to the West Coast snails, there is nothing in them more or less than a beggarly threshing of beaten straw, not a grain of wheat; or in other words, neither propriety nor advantage in their use"! Under *Holospira* a useful list of all known species is given, with critical remarks. Under the description of *Goniobasis*, doubts are expressed as to whether the western Melanians belong to *Goniobasis*—a subject already noticed by the Editor in the last NAUTILUS.

The subgenus *Cyclothyca* is proposed for a curious form like a depressed *Stomatia phymotis*, somewhat, probably parasitic on Echinus. The plates, three in number, are beautiful examples of photo-engraving.—H. A. P.



THE NAUTILUS.

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NOVEMBER, 1890.

No. 7.

A GLANCE AT THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

BY JOHN FORD, PHILADELPHIA.¹

The present building of the Academy of Natural Sciences of Philadelphia fronting on Logan Square, is a very large one, but the new structure, of which a perspective view is given on the opposite page, will be quite double the size; the front of the latter on 19th St., being 155 feet; and that on Cherry St. 130 feet, thus giving an additional surface area of 20,150 square feet. Four tiers of galleries 32 ft. wide will surround an open central hall, the whole illuminated by an arched glass roof springing at a height of 80 ft. above the floor. Added to these will be many rooms for Laboratory, Office and other purposes. The society for whose accommodations this noble edifice is being erected, is the oldest of the kind in America, it having been founded in 1812 by a few earnest seekers after knowledge. Since then many hundreds of names, among them a large number well known to-day, have been added to its membership. It is not strange, therefore, that for many years the society's decisions have had great weight in the scientific world.

In addition to its contributions to the progress of science through the publication of discoveries and investigations, and courses of popular lectures, it has established a museum of natural objects equal in many respects to the finest known. In this vast aggregation there

¹ EDITOR OF NAUTILUS, DEAR SIR: Accompanying this communication please find a picture of the building of the Academy of Natural Sciences of Philadelphia, as it will appear when the addition now under construction is finished.

are thirty thousand birds including the Gould collection of Australian species, the Bonaparte collection of European species and Verreaux series from Asia and Africa.

The collection of fossils, which is being systematically arranged by Prof. Angelo Heilprin, Curator-in-charge, contains some 20,000 trays of specimens besides a larger number of original types of American Tertiary fossils than all other collections in existence.

The Minerals, including the superb collection of the late Wm. S. Vaux, equal in numbers and beauty the best in the country.

Of no less interest and value is the collection of Insects which in extent and completeness is almost unrivaled. Nor less instructive and attractive is the Herbarium with its vast number of specimens, including 35,000 species of flowering plants.

Many other equally important collections are contained in the Museum.

Among these may be mentioned the Fishes, Reptiles, Corals, Sponges and Crustaceans, all of which are largely represented.

There are also some 1,700 specimens of human Crania and a host of Archaeological objects.

But of more especial interest, perhaps, to the readers of the Nautilus is the Conchological collection.

This is equal in all respects to the best in the world, and superior to all in the systematic arrangement of the specimens. There are fully thirty thousand species and named varieties in the collection, these embracing nearly a half million of specimens, the majority of which were presented from time to time by prominent Conchologists whose knowledge and means enabled them to select and secure the best examples available. To this fact may be ascribed much of the beauty and value of the collection.

As already stated the arrangement of the collection is superior to any in the world, and this is directly due to the careful study and matchless executive ability of the late Mr. Tryon who planned it in accordance with the design previously prepared by him for his masterly work the **MANUAL OF CONCHOLOGY**.

He did not live to see the entire fulfilment of his wishes but they are being faithfully carried out by his friend and sometime assistant, Mr. H. A. Pilsbry, the present conservator of the department and Editor of the Manual.

The primal group in the arrangement is a synoptical one embracing all of the principal genera known.

With each of these are a sufficient number of species to make the generic distinctions at once apparent, thus enabling the student to locate in the general collection any genus he might wish to examine.

Following this group are the genera with their full complement of species, the bulk of the latter represented by specimens, the remainder by figures or models.

First in line are the Cephalopods, which as your readers know, comprise the highest class of the Mollusca.

Only a few of these produce shells that are wholly external. A fine display, however, of those belonging to the Nautilus and Argonauta are to be seen, together with many rare models of shell-less species.

Near these are several trays of frail glass-like shells belonging to the class Pteropoda. Of this class quite a number of genera are represented making a very dainty and delicate group.

Next in order comes the Marine Gastropods, a class containing a far greater number of genera than either of the others named. Included in these are the Muricea, Tritons, Purpura, Volutes, Fusus, Mitra, Marginella, Olives, Cones and Cypraea.

In all of these are rare and costly specimens, while some of them show an almost complete series of the species.

This is especially so as regards the Cones, Olives and Cypraea, the last being the largest and finest collection of its kind in the United States save that belonging to John H. Campbell Esq. of Philadelphia, which is indeed worth a long journey to see. Exquisite specimens are also plentiful in the other genera mentioned. Passing from these the visitor will meet with many series of genera belonging to the same class. Though less prominent, perhaps, than those left behind, they are in some respects quite as interesting.

Among them is the genus Cerithium, a group of wax-like shells, whose "quaint and curious" forms make them delightfully attractive. Here too are the Littorina, the Turbo, Trochus, Phasianella and many others including the genus Haliotis which in beauty, number of species and size of specimens, can fairly claim the attention of all lovers of Nature's handiwork.

Near to these are the Patella, Bulla and Chitons, all of which are worthy of attention, though among the last of the Marine Univalves.

Here also, near the center of the west gallery, are located the cases intended for a special collection of all molluscous species belonging to the United States.

The idea of this collection emanated from the President of the American Association of Conchologists and there is every reason to believe that the members will agree with him and show their appreciation of the project in offerings of the best specimens obtainable near their respective homes. Just beyond these, in cases and drawers, can be seen a majority of all the fresh water species of the world, including the types of Rafinesque, Say, Conrad, Tryon, Haldeman Gabb and others, and a series of duplicate types of Lea's Unionidæ.

The series of Land Shells commences with *Oleacina*, a genus chiefly confined to the U. S. Gulf States and Central and South America. A majority of the species are shown, and as many of the shells are translucent, the visitor, for this and other reasons, will find them both interesting and instructive.

The same translucent, and in some instances transparent, character is also finely illustrated among species of *Vitrina* in a case near by. Just beyond the latter are several families containing a comparatively large number of genera. Of these the most familiar are *Gibbus*, *Zonites* and *Nanina*, the arrangement of which is entirely completed, a task that only expert conchologists can fully appreciate. In *Zonites* and *Nanina* many beautiful gems are presented, though none so singular in form, perhaps, as are the species *Lygonettianus* and *pagodus* in the genus *Gibbus*.

Next come the typical Helices, a genus containing some 3,400 species. An enormous number indeed to be of one kin. Among those exhibited are many specimens remarkable for size, perfection of finish, and the rare combination of colors adorning their surfaces. With these can be seen *H. picta*, from Cuba, with its forty color varieties, each "a thing of beauty and a joy forever;" *H. Gibboni* with its white and chestnut-colored crescents; and *H. Polygyrata* whose many whorls are alike suggestive of giddiness and French horns. Also scores of others no less enchanting though hailing, with their less favored brothers, from all continents and islands of the world. In the same family is that wonderful group known as the *Cochlostyla*. This comprises many sub-genera, including the typical *Cochlostylus* of Ferrussac. The group, however, as it is understood, embraces nearly all of the Helicoid and Bulimiform land species belonging to the Philippine and adjacent islands.

Nothing but superlatives of the highest order can do justice to the superb appearance of this group. Where each species exhibits a style of beauty peculiar to itself, and all are charming, any special reference to individual perfection would seem invidious.

Some, it is true, show a higher caste of beauty than do others, but none the less are they all graceful and fair to look upon. With slight modifications these remarks will also apply to the genus *Bulimus* in an adjoining case. This group is not so patrician in general appearance, but a large percentage of the species are sufficiently handsome to create a desire for possession in the heart of the collector.

Nor would this desire be lessened on his beholding, a few feet away, the grand display made by the genus *Achatina*, many species of which are quite large, symmetrical in form and radiant with color.

Following these, with an almost complete complement of species, are still many families belonging to the *Pulmonata*.

Among this number, the best known are the *Achatinellidae*, the *Cylindrellidae*, *Pupidae*, *Succineidae* and *Auriculidae*.

All are rich in species especially interesting to the student, and possibly so to the casual observer; but lack of space prevents any further allusion to them at present. For the same reason but little reference can be made to the multitude of bivalves still unnoticed. These belong to the Class *Pelecypoda*, and are chiefly marine. Among the most beautiful of the genera are the *Tellina*, *Cytherea*, *Tapes*, *Cardium*, *Trigonia*, *Spondylus* and *Pecten*. These are the queens of the Class, though many other genera are endowed with species but little inferior either in form or color.

Few, however, can rival the regal beauty of *Tellina radiata*, *Cytherea erycina*, *Tapes literata*, *Cardium pseudolima*, *Trigonia margaritifera*, *Spondylus princeps*, *Pecten pallium* and other species gracing their respective genera. All gems, rare gems from ocean sands and caves

"Where the foot treadeth not, nor the eye may scan;
Deep, deep from the haunts and the homes of man."

Philadelphia, October, 1890.

NOTES ON *BULIMULUS DORMANI* W. G. B.

BY CHARLES T. SIMPSON, WASHINGTON, D. C.

In the Oct. NAUTILUS Mr. Berlin H. Wright separates a form of *Bulimulus Dormani* from the type, calling it var. *albida*, and

makes the sweeping assertion that "*it is never found associated with the typical.*"

Such a statement is a very strong one, and would indicate either that the writer was thoroughly familiar with every locality in which the shell was found, or that others had searched over its entire area of distribution, and that all the facts regarding it were known. Such an amount of knowledge is scarcely possessed concerning any mollusk I know of. It is hardly safe to say with certainty that any shell of the later Tertiaries is extinct, that a species is never found outside of a given locality, or only under certain conditions, or that one form may not connect with another, because the army of lynx-eyed collectors at work now are creating continual surprises in such matters, bringing the dead to life and finding forms in just the places and under just the circumstances that other persons have said they could not.

While living at Braidentown, Florida, I found *Bulimulus Dormani* quite abundant, living and dead, in heavy hammock lands north of the Manatee River, and with the typical form, *on the very same trees*, I found quite a number of specimens without a vestige of color! The ground of most of these shells was a lovely pale porcelain, the spots were usually reddish brown, sometimes forming uninterrupted bands somewhat clouded, or more or less distinct; and between these and the unicolored shells, there was almost every variation. Some of the specimens were a uniform horn color, others a waxen or porcelain tint. There was also quite a range of variation in size and solidity; some shells measuring one and a fourth inches in length, others that I believed to be adult were not over three fourths of an inch long; some were quite solid for so frail a species, and others so fragile that they could be blown to fragments with the breath, and it was next to impossible to collect or handle the latter. Many of these were quite inflated, others attenuated, and I am inclined to believe that *B. marielinus* is only a dwarf, elongated form of this same shell.

In the collection of the U. S. Nat. Museum, there are a couple of shells (No. 29612) collected by W. W. Calkins, with only Florida given as a locality, and labelled *Bulimulus Floridanus* Pfr. These agree quite well with the figures of that species (448) in Binney's Manual of North American Land Shells, p. 407. The texture is more solid than *B. Dormani* or *Marielinus* as I have seen them, the whorls are somewhat convex, the last sub-angulated below the mid-

dle, the columella and aperture agree fairly well with the description, but the color is a uniform brownish buff, darker slightly on the base. They are close to certain unicolored forms of *B. virgulatus*, Rve. of the West Indies, and certainly seem different from anything I have seen bearing the name of *Dormani*, *Marielinus* or *Floridanus*. Mr. Calkins collected several years in Florida for the Chicago Acad. Nat. Sciences, published a catalogue of Florida shells and furnished a good deal of material for the Nat. Museum, and his localities seem to be reasonably accurate. I may remark in passing that *B. stramineus* Guild., of the Isle of St. Vincent, is extremely close to the unicolored forms of *Bulimulus Dormani*.

DESCRIPTION OF A NEW SPECIES OF ANCTUS.

BY JOHN FORD.

Anctus Pilsbryi, Ford, N. Sp.

Shell rimate-umbilicated, ovate-conical, spire acute, apex black: whorls 7, slightly convex, the last somewhat constricted near the base. Aperture extremely narrow, oblong; lip flatly reflected, the central portion for about two-thirds of its length provided with a flange extending toward the inner or columellar lip from which proceeds a corresponding convexity thus giving to the aperture a form much like the traditional key hole. Color light gray, painted longitudinally with brownish and black lines.

Length of shell 23, length of aperture 12, width between flanges 1 mill, width of flange on outer lip 2 mill. Color of lip white.

Habitat Brazil.

Anctus anglostoma and *A. Pilsbryi* are the only living species of the subgenus known and they are in some respects very much alike. In the former, however, the apex is not black and shining nor are the apertures at all alike, save in general outline. Indeed that of *A. Pilsbryi* is absolutely distinct from any other known to the writer. This alone would justify its specific separation, and it will be a miracle perhaps if a form so peculiar does not appeal to the genus makers as well.¹

Phila. Pa., Oct. 13th, 1890.

¹ The above description is chiefly drawn from memory, as the shell was unfortunately mislaid before the less salient features were thoroughly verified. It can be understood, however, that all of the characters given above are approximately correct.

SHELLS WITHIN CITY LIMITS.

While hunting for fossils in an old stone yard in Sedalia, I found that the *Pupa fallax*, Say, was quite plentiful, some stones of the size of a hand having nearly one hundred shells on the under side. Short searches on three different days gave about 2000 *Pupa fallax*, 250 *Pupa rupicola*, and 10 *Zonites minusculus*.

The stone yard is in the suburbs, and is grown up with grass, being surrounded by unbroken prairie. I had never before found any land shells in the city, nor either species of *Pupa* so abundant in any other part of the county. My surprise was increased a few days after to get large numbers of *Vallonia pulchella* collected by Mr. R. A. Blair on a vacant lot within a block of the business center of the city, being the first record of this species being found in the State. Along with these latter shells, were found two *Zonites arboreus*. This year has evidently been a favorable one for shell life, as it has been in this county, also, for fruits and vegetables.

Sedalia, Mo.

F. A. Sampson.

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

OCTOBER 21, 1890.

Since date of last announcement the following new members have been enrolled in the Association:

101. W. S. Teator, Upper Red Hook, N. Y.

102. C. A. Whittemore, Grand Rapids, Mich. *Helicidae, Unionidae and Michigan shells.*

103. R. H. Pettit, Ithaca, N. Y.

104. Albert Bailey, Chepachet, N. Y.

The United States Collection.

The announcement in the last number of the NAUTILUS, of the proposed formation of a great National Collection of United States Mollusca, to be deposited for permanent exhibition in the Academy of Natural Sciences, Philadelphia, has excited much interest among the members, quite a number of whom, have signified their intention of contributing specimens. The following is a sample of letters received by the President:

Bloomington, Ill. Oct. 18, 1890.

John H. Campbell Esq., Dear Sir:

In the Oct. number of the NAUTILUS, I notice the proposition of H. A. Pilsbry to form a complete special collection of the shells of

the U. S. to be deposited in the Academy of Natural Sciences, Philadelphia. I am very much pleased with the scheme and hope it will be successful. From time to time as opportunity offers, I will make up a box and send to you or direct to the Academy as you may direct. I will send West Coast shells.

Very truly,

G. W. Lichtenthaler.

Some of the Philadelphia members of the Association have already responded to the suggestion and have contributed some very handsome specimens as a nucleus for the collection. The full list of donations thus far made is noted below and from month to month the NAUTILUS will publish a list of additions made between the dates of issue.

It would be well to bear in mind the following rules:

1. None but members of the Association will be allowed to contribute to the collection.
2. None but the finest kind of specimens will be accepted.
3. The specimens must be from known, exact localities within the limits of the United States.
4. The donation of shells is purely a voluntary matter on the part of members.
5. The names and addresses of the donors will be written on the cards upon which the shells will be mounted.

The donations must be voluntary.

It must be understood that the matter of contributing specimens to the collection is purely a voluntary one on the part of members. There is no obligation on their part to contribute, or even to take an interest in the matter. Some of them may not care to donate specimens to be placed in the Philadelphia Academy, but may prefer to help along collections in their own localities. The collection will be labelled "Special Exhibit of United States Mollusca, contributed by members of the American Association of Conchologists," but the Association, as an organized body will not stand sponsor for the Exhibit. It could not do so without a meeting and a favorable vote by the members.

This will not prevent, however, members, who desire to do so, from contributing to the success of the project, and the Philadelphia members would be glad to have the help of all who look kindly upon the project.

All specimens should be sent addressed to the President, care of the Academy of Natural Sciences, 19th and Race Sts., Philadelphia. The president is a member of the Academy and generally manages to visit that institution once a week, to meet his fellow conchologists, and the specimens sent will receive his personal attention.

Donations to date.

The following species have been already received and mounted. All of the specimens are as fine as possible and include a number of valuable suites. The numbers prefixed to the names are the numbers of the trays.

John Ford, Philadelphia, Pa.—

2, *Solen Americana*, Gould, Atlantic City, N. J.; 10, Same, juvenile suite; 7, *Mactra solidissima*, Dillwyn, Atlantic City, N. J.; 8, Same, juvenile suite; 6, *Littorina irrorata*, Say, Atlantic City, N. J.; 31, *Pupa contracta*, Say, Philadelphia, Pa.

Charles W. Johnson, Philadelphia, Pa.—

3, *Planorbis tumidus*, Pfr., St. Augustine, Fla.; 4, *Siphonaria lineolata*, D'Orb., St. Augustine, Fla.; 5, *Urosalpinx Tampaensis*, Conrad, Lostman's Key, Fla.; 12, *Ovula uniplicata*, Sby., St. Augustine, Fla.; 13, *Lucina squamosa*, Lam., Stump Pass, S. W. Fla.; 14, *Macoma Tampaensis*, Conrad, Gordon's Pass, S. W. Fla.; 15, *Helix uvulifera*, Shutt., Sanibel Island, Fla.; 16, *Chondropoma dentata*, Say, near Gordon's Pass, S. W. Fla.; 17, *Odostomia impressa*, Say, St. Augustine, Fla.

H. A. Pilsbry, Philadelphia, Pa.—

20, *Helix cereolus*, Mühl., var. *Febigeri*, Bld., New Orleans, La.; 21, *Helix monodon*, Rack, var. *fraterna*, Say, near Lake Charles, S. W. La.

Joseph Willcox, Philadelphia, Pa.—

22, *Turritella plebeia*, Conrad, Miocene, St. Mary's, Md.; 23, *Arca aviculaeformis*, Heilprin, Pliocene of the Caloosahatchie, Fla.; 24, *Nassa peralta*, Conrad, Miocene, St. Mary's, Md.; 25, *Cypraea* (*Siphocypraea*) *problematica*, Heilprin, Pliocene, Caloosahatchie, Fla.; 26, *Physa Meigsii*, Dall, same locality; 27, *Voluta Floridana*, Heilprin, same locality; 28, *Chama crassa*, Heilprin, same locality; 29, *Cardium laqueatum*, Conrad, Mio-

cene, Patuxent R., Md.; 30, *Lucina Floridana*, Conrad, Estero Bay, S. W. Fla.

William J. Fox, Philadelphia, Pa.—

32, *Cerithium atratum*, Born., San Marco, S. W. Fla.; 33, *Cerithium muscarum*, Say, Gordon's Pass, S. W. Fla.

John H. Campbell, Philadelphia, Pa.—

1, *Cypraea exanthema*, Linn, near Key Largo, Fla.; 9, same, juvenile forms; 11, *Vitrizonites latissimus*, Lewis, Roan Mt., Tenn.; 18, *Trophon Belcheri*, Hinds, San Diego, Cal.; 19, *Cypraea spadicea*, Swainson, San Diego, Cal.

Total—23 genera, 30 species, 33 trays.

GENERAL NOTES.

SOME AMERICAN CANNIBALS.—ED. NAUTILUS, DEAR SIR.—During a recent stroll in Fairmount Park I found beneath an old railroad tie about thirty healthy looking *Limax agrestis*, Linn. These I placed in a small collecting box which already contained quite half as many *L. campestris*, Binney.

On opening the box a half hour later I found, to my surprise, that two of the *campestris* were rapidly disappearing within the jaws of a pair of *agrestis*.

Having no means to separate the species I closed the box again and left it so for about twelve hours.

Upon reopening it there was but one *campestris* living. With exception of a few reddish stains not a vestige of the others could be discovered.

Of course the living one could tell no tales, but the fact remained that all the rest of its kindred had involuntarily evolved into *Limax agrestis*, Linn.

Moral, when *Bulls* are near let Conservatives beware.—John Ford, Phila., Oct. 1890.

EXCHANGE.—I have for exchange twenty-five species of *Unios* from Illinois and Spoon river, including about two hundred very fine *Anodonta suborbiculata* Say.

Wanted other *Unios* and Sea shell.—Dr. W. S. Strode, Bernadotte, Ill.

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THE NAUTILUS.

VOL. IV.

DECEMBER, 1890.

No. 8.

A NEW AMERICAN PISIDIUM.

BY EDWARD W. ROPER, REVERE, MASS.

Pisidium Idahoense Roper.

Shell large, sub-ovate, full, oblique, inequilateral, anterior end a little longer, margin well rounded; beaks scarcely raised, not prominent, approximate at apex; lines of growth delicate; epidermis glossy, light yellow, some specimens with brownish zones in center of valves, not extending to the edges, leaving a broad marginal border; interior bluish white; hinge margin curved, narrow; cardinal teeth very small, lateral teeth long and slender.

Length, 0.35; height, 0.31; breadth, 0.21 inches.

This shell is quite different from *Pisidium Virginicum*, the only American species of equal size. *P. Virginicum* has the beaks fuller, more elevated and nearer the posterior end; the hinge margin and teeth broad and heavy; the shell more elongated and in every way more solid.

About forty specimens of *P. Idahoense* were collected by Mr. Henry Hemphill in a muddy slough near Old Mission, in northern Idaho. He did not find it in other localities.

NOTES ON FLORIDA BULIMULI.

BY G. W. WEBSTER, LAKE HELEN, FLA.

In the Nov. NAUTILUS Mr Chas. T. Simpson gives some notes on *Bulimulus Dormani* which I have read with interest. As to the

Var. *albida* so named by my friend Mr. B. H. Wright, I wish to offer a little further explanation, that Mr. Wright nor I have ever found typical *B. Dormani* associated with spotless *Bulimuli* would weigh nothing against Mr. Simpson's having found them near the Manatee River. I hope in the not far distant future to visit that region and see for myself, but at the same time Mr. Simpson never having found the light colored var. entirely remote from any typical *Dormani* would not prove anything against there being a locality near Lake Helen where they are to be found at least 10 or 12 miles from a single specimen of well marked *B. Dormani*, and that there is such a locality I am very positive. I think they were first found about three years ago by my son Oscar B. Webster and myself.

They are to be found in a small hammock of probably less than 200 acres, so isolated from any other hammock as to render communication with any other *Bulimuli* quite improbable. My own theory with regard to them is that having had a common origin with the *B. Dormani* in other parts of Florida, they have been so long separated from the typical form, hundreds, perhaps, thousands of years, that some peculiarity of food or situation has finally developed a type of very transparent, light colored and nearly spotless shells. These characteristics have become so constant that I have never seen a single example of them that I should consider a good representative of *B. Dormani*. There may be other localities where a type of similar shells, all so nearly alike, may be found but I shall be surprised if any such is ever found. That the same type is to be found in other localities along with typical *B. Dormani* would be very probable, but though we have spent many days and weeks looking for *Bulimuli* among the hammocks of the St. John's River and along the East Coast of Florida for nearly 250 miles, we have never yet met with any such shells. The only white *B. Dormani* we have found among the typical have been such as have evidently become faded on account of age.

Nearly two years ago I sent Prof. W. H. Dall three specimens of *albida* of which he wrote in reply, "Those *Bulimuli* without spots are just lovely." W. G. Binney wrote me Sept. 3, 1889, with regard to some of the *albida* that I had sent him, "The *Bul. Dormani* in yours of Aug 29, are much more interesting to me for their long narrowed form, than even for their marking. I hope some day to figure them." Two years ago when I first showed some of them to

Mr. Wright with the remark that "they would hardly pass for typical *Dormani*," he at first thought they would, but further examination convinced him that their peculiar markings were constant and quite striking. He is certainly mistaken in saying that they are always a pure white shell and entirely spotless. Many that we have found are prettily marked with three bands on the last whorl often very faint that corresponds to the three rows of spots on the typical *Dormani*, and many of them have just enough spots, very faint ones to show their relationship. However, the lightest *Dormani* I have seen in any other locality will show several times more spots and color than the darkest *albida* I have seen. All the Florida Bulimuli I have seen show more or less of bands on some examples, but these show much more trace of bands than the horn-colored Bulimuli that we have occasionally found along the east coast for a distance of 200 miles. That there are no typical *B. Dormani* in the hammock where the *albida* are found, I am quite sure, as it is only three miles from our home and we often go there and have looked over about the whole ground many times, finding I think 27 species of shells. We have found two types of Bulimuli near the east coast both of them much like Binney's No. 449, in form, but very unlike his 448. They are very fragile shells, one of them nearly white with conspicuous bands and the other plain horn color. Whether they are to be called *Floridana* or *Hemphilli*, I think that for the accomodation of collectors and students they should be distinguished by different names. If a collector should write to me for *B. Hemphilli* expecting to get a white banded shell and I should send him a horn-colored one he would have good reason for being disappointed. So far we have found them to be very rare shells.

CONCHOLOGICAL NOTES FROM OREGON.¹

* * * During my recent visit to Oregon I had opportunities for seeing *Goniobasis plicifera* Lea living in the Columbia River near Astoria, mostly on stones in small pools along the rocky margin. Also *G. nigrina* Lea which occurs in large numbers in the brook running from several large springs near Susanville, Lassen Co., Cal., at an elevation of 4700 feet above the sea. The same species was noticed in a watering trough fed by a spring on the road

¹ A letter from Dr. W. H. Dall to the Editor of the NAUTILUS.

crossing the Sierra, a little to the south and west of Susanville, the elevation being about 5500 feet which I think is the highest altitude at which any *Strepomatid* has been collected.

Both these species have a smooth mantle-margin, *G. plicifera* being dark slate-color finely dotted with sulphur yellow while in *G. nigrina* the color is nearly black, inclining to slaty. It is probable, therefore, that all our American *Strepomatidæ* agree in this feature and that as Stimpson supposed we have no typical Melanians with a fringed mantle-edge.¹

An interesting feature in the malacology of this region is the absence of *Unio* from all the streams, though found fossil in the tertiary of this region. I found *Margaritana margaritifera* of normal form and size abundant up to a height of over five thousand feet above the sea level, in the northern Sierras. At this height it was not accompanied by *Anodonta*.

It is very remarkable that typical *Vivipara* occurs not uncommonly in the Pliocene or possibly the Quaternary fresh water shell-marl of the old Lake beds, both of the Snake River (Oregon) basin and the Lahontan basin (California and Nevada). Why *Unio*, *Lithasia* and *Vivipara* should have disappeared when their associated *Carinifex* and *Pompholyx* persist in the same vicinity specifically unchanged, is an inexplicable mystery at present. It shows at least that the West Coast fauna was formerly more intimately connected with that of the eastern region of the United States, than at present.

Another interesting feature of my visit was the determination, by the aid of the researches of that veteran geologist Prof. Thomas Condon of the State University, of the existence of marine Pliocene fossils at Shoalwater Bay, Wash. conformably underlying the quaternary and indicating, by the presence of *Buccinum cyaneum* and other northern forms, at that epoch a colder climate than at present. The most remarkable, and only new form in this bed is a fine *Mytilus* as large as *M. californicus* but distinguished from all other species of the genus by its surface which resembles that of *M. edulis* superimposed upon which are a few, strong, divaricating ridges extending from about the middle of the valves toward the posterior extreme.

¹ Alcoholic specimens of Western *Gonicbasis* recently examined by me, sent by Mr. E. H. White of Astoria, Oregon, confirm the observations of Dr. Dall respecting the smooth mantle-edge. I hope to figure the dentition later.—ED.

Many species have the surface covered with fine divaricating lines, but I believe there is none known in which there are a few strong distant ridges, perhaps not exceeding half a dozen on the surface of a shell six inches in length, and having otherwise the form and aspect of a giant *M. edulis*. For this interesting species I propose the name of *M. Condoni* in honor of its discoverer.

I did not succeed in reaching the southern part of the State where the enthusiastic lady collectors are upsetting all our previous notions by finding new species (and big ones, too,) in a fauna which everybody supposed had been well searched, to say nothing of advancing many Lower Californian types many miles to the north. I am beginning to believe that if the ladies set their minds to it we shall be having a lot of new species from New England next.

Prof. O. B. Johnson of the State University at Seattle, Wash., among other rarities, has recently dredged in the deep water of Puget Sound near Port Orchard, a few splendid specimens of *Cryptodon* or *Acinus bisectus* Conrad, originally described (as *Venus bisectus*) from the Miocene of Astoria. It is the giant of the genus, being over two inches in length, far surpassing in size any other living species yet known.

WM. H. DALL.

A CATALOGUE OF CONCHOLOGICAL ABBREVIATIONS.

BY F. C. BAKER, ROCHESTER, N. Y.

The following pages comprise an alphabetical catalogue of the abbreviations in common use for writers on conchological subjects, together with their full names and nationalities.

While not exhaustive the names of all the more prominent writers upon the subject are given. It is therefore hoped that the list will prove useful to beginners and those more advanced in the subject as well.

A.

Ad. A.	Adams, Arthur.	English.
Ad. H.	Adams, Henry.	English.
Ad. C. B.	Adams, Charles B.	American.
Alb.	Albers, Johann Christ.	German.
Ald.	Alder, Joshua.	English.

Anth.	Anthony, J. G.	American.
Ant.	Anton, Hermann Eduard.	German.
B.		
Berth.	Berthelot, Sabin.	French.
Bgt.	Bourguignat, M. J. R.	French.
Bk.	Beck, H.	German.
Blainv.	Blainville, M. H. de.	French.
Bld.	Bland, Thomas.	American.
Blf.	Blanford, N. T.	English.
Boettg.	Boettger, Dr. Oscar.	German.
Bourg.	Bourguinat, M. J. R.	French.
Brod.	Broderip, W. J.	English.
Brug.	Bruguiere, M.	French.
Brus.	Brusina, Spiridion.	Italian.
Binn.	Binney, Amos.	American.
C.		
Calc.	Calcara, P.	Italian.
Cantr.	Cantraine, F.	French.
Carp.	Carpenter, P. P.	English.
Chemn.	Chemnitz, J. H.	German.
Conr.	Conrad, T. A.	American.
Coop.	Cooper, Dr. J. G.	American.
Couth.	Couthouy, J. P.	American.
Cpr.	Carpenter, P. P.	English.
Crist.	Cristofori, G.	French.
D.		
Deb.	Debeaux, O.	French.
Desh.	Deshayes, G. P.	French.
Dillw.	Dillwyn, Lewis W.	English.
Dkr.	Dunker, W.	German.
Don.	Donovan, Edward.	English.
D'Orb.	D'Orbigny, A.	French.
Drap.	Draparnaud, J.	French.
Drp.	Draparnaud, J.	French.
Ducl.	Duclos, M.	French.
Dup.	Dupuy, D.	French.
E.		
Eichw.	Eichwald, E. von.	German.
Esch.	Eschscholtz, Dr.	German.
Ehrenb.	Ehrenberg, Dr.	German.

F.

Fabr.	Fabricius, O.	Swedish.
Fbs.	Forbes, Edward.	English.
Fer.	Ferussac, J. B. L. D. de.	French.

(To be continued.)

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

DECEMBER 10, 1890.

Since the issue of the list of members, the following new members have been enrolled :

105. Prof. F. M. Witter, Muscatine, Iowa.
106. Miss Addie C. Appleton, Haddonfield, N. J. *Shells of New Jersey.*
107. Rev. Henry W. Winkley, Saco, Me. *New England Mollusca.*
108. Geo. W. Webster, Lake Helen, Fla. *L. and F. W. Shells of Florida.*
109. Oscar B. Webster, Lake Helen, Fla. *L. and F. W. Shells of Florida.*
110. James Shepard, New Britain, Conn. *Connecticut Mollusca.*
111. Prof. O. B. Johnson, Seattle, Wash.
112. J. G. Cooper, M. D., Haywards, Cal. *West Coast Mollusca.*
113. Mrs. Geo. Andrews, Knoxville, Tenn. *No. Amer. Land Shells.*
114. Chas. Russell Orcutt, San Diego, Cal. *Nudibranchiata.*
115. E. H. White, Astoria, Oreg. *Achatinella.*
116. Chas. L. R. Wheeler, Cape May, N. J. *Unionidae.*
117. J. J. White, Palm Beach, Fla.
118. John M. Clarke, Albany, N. Y. *Palaeozoic Mollusca.*
119. Wm. B. Marshall, Albany, N. Y. *Unionidae and New York Mollusca.*
120. Chas. Schuchert, Albany, N. Y. *Brachiopoda.*
121. Dr. Wm. H. Rush, U. S. N., Philadelphia, Pa. *Pteropoda and Heteropoda.*
122. Joseph Sayers, New Britain, Conn.
123. E. H. Fiske, Santa Cruz, Cal. *Fossil Shells of Pacific Coast.*

The following members have selected subjects, viz.:

Arthur F. Gray, Yonkers, N. Y. *West Indian Land Shells and Strophia.*

Prof. J. B. Steere, Ann Arbor, Mich. *Philippine Helicidae.*

L. H. Streng, Grand Rapids, Mich. *Limnea and Physa (No. America.)*

R. H. Pettit, Ithaca, N. Y. *L. and F. W. Shells of America.*

Albert Bailey, Chepachet, N. Y. *L. and F. W. Shells of New York.*

Rev. Geo. W. Taylor has removed from Stewarton, Ottawa, to Victoria, B. C.

The growth of the Association has been very gratifying and its value will be more and more appreciated as its list of members is increased. The officers constantly receive encouraging letters from the members.

The United States Collection.

The idea of the United States collection has been generally approved. Many of the members are enthusiastic. From the letters received and the shells promised, the collection bids fair to assume large proportions in a very short time. Starting with the first donations made by the officers and by Messrs. Pilsbry, Willcox and Fox of Philadelphia, announced in the last NAUTILUS, a box of shells, comprising 130 West Coast species, was received from G. W. Lichenthaler, Bloomington, Ill. Some of the specimens and suites (particularly the *Haliotidae*) are magnificent and show the judgment of a trained collector and lover of shells. A fine lot, including some interesting fossils from the Miocene Siliceous Beds of Ballast Point, Florida, has also been received from Miss C. Antoinette Shepard of New Britain, Conn. Other donations have been received from Messrs. Thos. Morgan, Somerville, N. J., Joseph Willcox, Philip Nell, William J. McGinty, Wm. J. Fox and Mr. Campbell of Philadelphia, Wm. J. Raymond, Oakland, Cal.; Dr. W. S. Strode, Bernadotte, Ill.; Albert Bailey, Chepachet, N. Y.; and Chas. Le R. Wheeler, Cape May, N. J. They will be duly acknowledged. Mr. J. A. Singley, Giddings, Texas, writes: "I approve of the plan. I'll contribute some desirable 'Texas' species to 'our corner' and will continue sending at times until I contribute some of everything I find in the State."

Mr. Geo. J. Streator, Garrettsville, Ohio, writes: "I shall be glad to donate to the U. S. collection some of the best shells of this part of Ohio."

Mr. Geo. W. Webster, Lake Helen, Florida writes: "Myself and son shall be glad to donate examples to the U. S. collection. We are much interested in the subject."

These are but samples of the letters which are being constantly received. In sending specimens, members should avoid duplicating species already in the collection. None but the finest kind of specimens should be sent.

As the shells are received they are examined, prepared for mounting, named and then mounted upon cards, which fit into neat trays. Special attention is paid to the labelling, each species having the exact name and locality and name and address of the donor, thus:

<p style="text-align: center;">Haliotis corrugata, Gray, Catalina Id., Cal. G. W. Lichtenthaler, Bloomington, Ill., 1890.</p>

Fossil species are placed with living species of the same genus, so that ready comparisons may be made between them.

Donations to United States Collection.

Since last announcement the following have been mounted and placed in the collection. The numbers attached to the names designate the trays. [Want of space in this number, compels us to defer part of the list until next month.]

G. W. Lichtenthaler, Bloomington, Ill.—

45, *Purpura crispata*, Chemn., Puget Sound, Wash.; 46, *Purpura saxicola*, Val., Monterey, Cal.; 80, *Purpura canaliculatum*, Ducl., Tillamook Bay, Oreg.; 79, *Buccinum cyaneum*, Brug., Alaska; 60, *Siphonalia Kellettii*, Forbes, Santa Barbara, Cal.; 59, *Chrysodomus dirus*, Reeve, Alaska; 48, *Nassa perpiniguis*, Hinds, San Pedro, Cal.; 68, *Amphissa corrugata*, Reeve, Puget Sd., Wash.; 78, *Crucibulum spinosum*, Sby., San Diego, Cal.; 51, *Crepidula adunca*, Sby., San Diego, Cal.; 49, *Vermetus squamigerus*, Cooper, San Diego, Cal.; 86, *Littorina scutulata*, Gould, San Luis Obispo, Cal.; 85, *Littorina Sithana*,

Phil., Port Townsend, Wash.; 90, *Bittium filosum*, Gould, Alaska; 82, *Potamides (cerithidea) sacrata*, Gould, Oakland, Cal.; 54, *Trochiscus Norrisii*, Sby., Catalina Ids., Cal.; 35, *Haliotis Kamtschatkana*, Jonas, Alaska; 36-37, *Haliotis fulgens*, Philippi, Catalina Ids., Cal.; 38, *Haliotis corrugata*, Gray, same locality; 39, *Haliotis cracherodii*, Leach, Cal.; 40, *Haliotis rufescens*, Sw., Santa Barbara Ids., Cal.; 41, *Haliotis assimilis*, Dall, San Diego, Cal.; 47, *Lucapina crenulata*, Sby., San Diego, Cal.; 60, *Bulla nebulosa*, Gould, San Diego, Cal.; 56, *Selenites Vancouverensis*, Sea, Vancouver, Wash.; 53, *Helix fidelis*, Gray, Oreg.; 52, *Limnaea stagnalis*, Linn., Seattle, Wash.; 50, *Parapholas Californicus*, Conrad, San Diego, Cal.; 43, *Siliqua patula*, Dixon, near Astoria, Oreg.; 42, *Semele decisa*, Conrad, False Bay, Cal.; 89, *Cumingia Californica*, Conrad, San Diego, Cal.; 55, *Donax Californicus*, Conrad, La Jolla, Cal.; 65, *Venus fluctifraga*, Sby., San Pedro, Cal.; 64, *Tapes staminea*, Conrad, Tongas Id., Alaska; 63, *Cytherea (Pachydesma) crassatelloides*, Conrad, Cal.; 75, *Sphaerium sulcatum*, Lam., Salem, Oreg.; 87, *Cardium consors*, Brod., Tillamook Bay, Oreg.; 57, *Cardium corbis*, Mont., Tongas Id., Alaska; 88, *Cardium (Laevicardium) elatum*, Sby., San Diego Bay, Cal.; 91, *Modiola capax*, Sby., Monterey, Cal.; 93, *Pecten latiauritus*, Conrad, Santa Barbara, Cal.; 44, *Amussium caurinum*, Gould, Port Townsend, Wash.; 62, *Hinnites giganteus*, Gray, San Diego, Cal.

C. Antoinette Shepard, New Britain, Conn.—

129, *Fasciolaria tulipa*, Linn. Key West, Fla.; 130, *Ianthina communis*, Lam., same locality; 131, *Marginella carnea*, Storer, same locality; 133, *Littorina rudis*, Don., Niantic, Conn.; 134, *Crepidula glauca*, Say, Wellfleet, Mass.; 135, *Donax variabilis*, Say, Fernandina, Fla.; 136, *Pinna carnea*, Gmelin., Key West, Fla.; 137, *Pinna seminuda*, Lam., Fernandina, Fla.; 138, *Latirus Floridana*, Heilp., Miocene Silex Beds, Tampa, Fla.; 139, *Turritella Tampae*, Heilp., same locality; 140, *Crassatella deformis*, Heilp., same locality; 141, *Cardita serriocosta*, Heilp., same locality; 142, *Cytherea nuciformis*, Heilp., same locality.

Joseph Willcox, Philadelphia.—

128, *Solenosteira Mengeana*, Dall, Pliocene of Caloosahatchie, Fla.; 174, *Niso Willcoxiana*, Dall, same locality; 173, *Fulgur*

echinatum, Dall., Pliocene, Shell Creek, Fla.; 176, *Orthalicus zebra*, Müll., Florida Keys.

Wm. J. McGinty, Philadelphia.—

Marginella varia, Sby.; *Unio orbiculatus*, Hild., Ohio R.

Philip Nell, Philadelphia.—

153, *Selenites concavus*, Say, Philadelphia; 155, *Anodonta fluviatilis*, Lea, Delaware R., Phila.; 156, *Patula alternata*, Say, Philadelphia.

Wm. J. Fox, Philadelphia.—

34, *Potamides (Cerithidea) scalariformis*, Say, Indian R., Fla.; 125, *Vertigo Bollesiana*, Morse, Philada.; 126, *Truncatella bilabiata*, Pfr., Oak Lodge, Fla.; 127, *Zonites cellarius*, Müll., Philadelphia.

John H. Campbell, Philadelphia.—

151, *Nassa fossata*, Gould, San Diego, Cal.; 150, *Helix Californensis*, Lea, Cal., with varieties, *ramentosa*, Gould: *Bridge-sii*, Newc.: *Nickliniana*, Lea and *Diabloensis*, Cooper.

John Ford, Philadelphia.—

163, *Mytilus edulis*, Linn., Atlantic City, N. J.; 164, *Modiola modiolus*, Lam., Atlantic City, N. J.; 169, *Crepidula fornicata*, Linn., Providence, R. I.; 165, *Unio nasutus*, Say, Potomac R., (Washington); 166, *Unio complanatus*, Lea, same locality; 167, *Unio Fisherianus*, Lea, same locality; 168, *Unio radiatus*, Linn., Providence, R. I.

Total— 140 genera, 186 species, 196 trays.

GENERAL NOTES.

OSTREA GIGAS *Thunberg*.—In a collection of Japanese mollusks made by Mr. Frederick Stearns of Detroit, Mich., the writer found a specimen of this species measuring $17\frac{5}{8}$ inches long, greatest breadth $3\frac{3}{4}$ inches, length of ligament area $3\frac{3}{4}$ inches. It is by far the largest recent oyster on record. Locality, Enoshima, Japan.—*H. A. Pilsbry*.

TEBENNOPHORUS HEMPHILLI.—Last Spring I found in Marion Co., Indiana, one specimen of *Tebennophorus Hemphilli* W. G. Binney, and revisited the place often since to find more, but succeeded only in taking a second (young) specimen.

So far the species has been known to exist only in North Carolina, and I deem it worth of notice that a new locality has been found.—*Dr. Fr. Stein, Indianapolis, Ind., in letter to ed.*

SPECIES DETERMINED.—From Mrs. M. Burton Williamson, University P. O., Cal. No. 1 (a) *Cytherea lusoria* Chemn., Japan; 1 (b) *Cytherea meretrix* Linn. Var. *castanea*, Lam., Japan. 2. *Neritula neritea* Linn., Crimea; 1. (small ones) *Neritula Kamieschi* Chemn. Crimea; 3. *Bittum reticulatum*, De Costa, Crimea; 4. *Phasianella pulla*, Linn., Crimea; 5. *Mytilus minimus* Poli, Crimea; 6. *Rissoia violacea*, Desm., Crimea.—*C. W. J.*

SCALPELLUM STEARNSII.—The writer found numerous specimens of an undescribed *Scalpellum* in a collection of Japanese mollusks and crustaceans made by Mr. Frederick Stearns of Detroit, Mich. The form differs from all recent species known, in the shape of the carinal latus, which projects in a long recurved hook below the carina. In this respect it is close to the *S. Pfeifferi* Weithofer, an Austrian miocene species. From this it is separated, however, by the form of the inframedian latus, which is about as broad as high in the *S. Stearnsi*, but is decidedly higher than broad in *S. Pfeifferi*. The sculpturing of the valves also differs from the form named. Illustrations will be given later.—*H. A. Pilsbry.*

SPECIES DETERMINED.—From M. Schepman, Rhoon, near Rotterdam, Holland. 1, 2, 5, *Cerithium ferrugineum* Say; 3, *C. ferrugineum* var. *versicolor* Ad.; 4, *C. eburneum* Brug; 6, 7, *C. atratum* Born.; 8, 9, 10, 11, 12, *C. minimum* Gmel. All from the Bahamas.—*H. A. P.*

LUCAPINELLA, A new genus of Fissurellidæ.—This genus was defined in my key to the genera of Fissurellidæ in the Manual of Conchology, part 47, but no type was mentioned, as the text relating to the genus will appear in the next part of that work. It includes the "*Clypidella*" or "*Fissurellidea*" *calliomarginata* Cpr. of California, and the following forms: *æqualis* Sowb., Panama; *limatula* Rve., West Indies; and *aculeata* Reeve. It differs from *Fissurella* and all its subgenera in having the central teeth of the radula of a square shape, about as broad as long; from *Fissurellidea*, *Pupillæa*, *Lucapina*, *Megatebennus* in having the shell entirely free from the mantle which more or less envelopes it in those genera; the fleshy foot being likewise nude, not covered by the mantle. The margins of the shell are nearly level, as in *Lucapina*, and the orifice is about in the middle.—*H. A. Pilsbry.*

THE NAUTILUS.

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No. 9.

MOLLUSKS OF THE SAN FRANCISCO MARKETS.

BY PROF. JOSIAH KEEP, MILLS COLLEGE, CAL.

It would be interesting to know how many species of edible mollusks are to be found in the markets of the great cities of our country. I suspect that the number would be found to be surprisingly small, when we consider what a vast array of species fall into line and set themselves in array against the bewildered beginner, when he opens the simplest manual and attempts to gain familiarity with their names and natures. For one, I would be much interested to read in the "NAUTILUS" a series of articles upon the food mollusks which may be bought in the markets of our country; said articles to be written by various observers, each one reporting for his own locality.

The species of mollusks which the ordinary purchaser will find in the "fish markets" of San Francisco are only five in number, and of these, the amounts sold are very unequal. The first in importance as well as in social standing, so to speak, is the "Eastern Oyster," *Ostrea Virginica* Gmelin. This distinguished visitor to our coast is highly prized by all lovers of good things; far too highly prized, by the dealer, to admit of its forming any considerable portion of the food of the average conchologist. The price per dozen varies from twenty-five cents to half a dollar or more, according to size. The surprise of those who have been accustomed in the East to buy oysters by the quart, when they attempt to repeat their purchases here, is almost painful. A quart of oysters is something which few people in San Francisco ever call their own. Of course I do not

refer to the canned article, which may be bought for reasonable prices, but to the fresh and delicious bivalve, just "tonged" up from the waters of the bay.

But there is some reason for these high prices, for the dealer must first pay the fare of every one of these mollusks for a journey of three thousand miles. Of course they do not come in palace cars, but they must be hurried through on almost express time, because their intense desire for the sea will brook no delay. They detest the prairies, and care nothing for Rocky Mountain scenery; all they ask for is the ocean brine, and if they cannot have it speedily, they grieve their lives away on the road.

They are brought here in barrels, from Baltimore and other cities, when their shells are about the size of quarter or half dollars. Immediately after their arrival they are emptied upon rafts and towed to certain flats near the shores of the bay. When in the proper locality, the oyster-man takes up a shovelful of the young oysters and sows them into the water, as the farmer sows the seed-grain upon the furrows. As the raft is moved, he scatters more of the shelly seed and drives down poles to mark the boundaries of his new sown field. After lying at the bottom for a year or two, they are fished up upon the raft again. They have grown, some more than others, and are more or less aggregated into clusters. These clumps are broken up and the larger oysters are put by themselves. The smaller ones are thrown back, while the larger ones are transferred to an adjoining flat, or, if they are large enough, they are taken to the market. Usually, however, they live in our waters some three or four years before they are of sufficient size to be most profitable.

"But don't they multiply?" you may ask. Very little. They produce eggs in abundance, but few of them mature, and it has always been found necessary to bring young oysters from the East. Why the young fry do not survive I cannot say, but I believe it is because the ocean water here, even in summer, remains quite cold; too cold, probably, for the delicate infants whose ancestors have been accustomed to downright summer weather, during the "no-R" months. A few hardy ones do survive, however, and may in time produce a more robust race, but it is hinted that the dealers do not look upon them with great favor, as they find it more profitable to pay the freight—and keep up the prices.

The second mollusk on our list is also an oyster, but it is a very little one, the *Ostrea lurida* Cpr., or, as it is commonly called, the native or Oregon oyster. It lives in various places along the western coast, but is most abundant in the vicinity of Puget Sound. The shell is thin, and is seldom more than two inches in length. This oyster is very palatable, however, what there is of it, which is not much, and a sufficient number of them make an excellent stew. They are sold for about fifty cents a hundred, but the trade is limited.

The third species is a common creature, cheap enough for common people to use freely. Unlike the aristocratic oyster, it came to us unbidden; and more unlike still, it thrives and propagates and multiplies exceedingly. It is the *Mya arenaria* Linn., the real soft-shelled clam of Rhode Island, and "all along shore." Unknown in San Francisco Bay before 1874, it suddenly appeared, and in a few years the mud-flats around Oakland and Alameda became one of its most favorite breeding places, and the smooth surface at low tide resembles the top of a pepper box. This mollusk quickly grows to a large size and while lacking the delicious flavor of the oyster, it makes a very acceptable chowder. Great numbers of these clams are dug at low tide by the Chinese, and are retailed by them for a very moderate price. The *Mya* certainly holds the second place in respect to importance, and even disputes with the oyster for the first honors.

The puzzle of its sudden and recent advent can probably be solved by remembering what has been written about the oysters. It is likely that a few humble clams came in the oyster barrels as stowaways, unthought of and unknown; but lo, they made good speed to fill the bay with their descendants, while the infant oyster pines and dies for warmer water.

The "Hard-shelled Clam," *Tapes staminea* Conr., holds the fourth place among the merchantable mollusks of our coast. This is a variable species, some of the varieties growing to the size of a large hen's egg; but most of the specimens found in the markets are smaller. The shell is thick and strong, oval in form, and is ornamented with numerous fine ribs which radiate from the umbones. Its color is white or light gray, dashed with more or less stripes or chevrons of brownish purple. This mollusk loves the seacoast, and makes its burrows in gravelly or stony bottoms, instead of affecting muddy flats like the *Mya*. They are gathered somewhat sparingly,

most of the supply for this market coming from Tomales Bay, and are sold at moderate rates.

The edible mussel, *Mytilus edulis* Linn., is also to be found in the markets, though in small quantities, and apparently it is not in very great demand. Most of the specimens are of the small, smooth, dark purple variety, and average about two inches in length. They live in the bay, and attach themselves in great numbers to the piling of the wharves and similar stable objects to which they may fasten their strong byssus of horny threads. Along the coast outside of the bay, the larger mussel, *Mytilus Californianus* Conr., lives in great numbers, attached to the shaggy rocks which border the ocean, and sometimes grows to the length of eight or ten inches. This species is also edible, and the orange colored flesh of hot mussels, roasted in a fire of drift-wood, and seasoned with the sauce of sea-breeze hunger, has a delicious flavor which is not soon forgotten.

Occasionally you may find one or two other mollusks in the markets, but seldom. I have seen the large *Cardium corbis* Mart., and the Chinese eat the Squid, while the Frenchmen sometimes secures on the sly a big *Helix*: but these five species, two oysters, two clams and a mussel, are all that are commonly exposed for sale.

A NEW SPECIES OF LIMPET FROM JAPAN.

BY H. A. PILSBRY.

Patella (*Helcioniscus*) *Stearnsii*, N. Sp.

This is a form of *Patella* resembling outside the *P. exarata* Nutt., of the Sandwich Islands. It is the size of that species but usually somewhat more elevated. Color blackish-brown, with rays of white or greenish; dull and lusterless. Outside sculptured with about 50-56 strong, more or less nodose riblets, separated by deeply cut furrows. Interior bluish-white, but stained darker in places by the color of the outside, showing through; *the area inside the muscle-impression of a rich chestnut-brown color.* Around the margin are alternate blotches of blackish-brown and white, the blackish usually predominating; edge scalloped. The ribbing of the outside is not nearly so plainly indicated in the interior as in *P. exarata*, and in the space between the muscle-impression and the more vividly colored marginal border, *very fine, interrupted concentric wrinkles may*

be seen. This is a character not shown by *P. exarata*. The interior as a whole is somewhat iridescent.

Alt. 21, length 38, breadth 29 mill. Another specimen measures, alt. 18, length 41, breadth 31½ mill.

Specimens were procured by Mr. Frederick Stearns of Detroit, Michigan, on the coast of Japan, Kii Province.

It is possibly the form referred to by Dunker as *P. exarata*. From that species it may be distinguished by many characters, such as coloration, that species having black ribs on a whitish ground, and a milky-white interior, whilst *Stearnsii* has blackish rays, covering several ribs and their interstices, and a chestnut-brown area inside the muscle-attachment. The peculiar sculpture of the inside is also of itself diagnostic. Dunker (Index Moll. Maris Japonici, p. 157) also mentions *Patella mazatlanica* Gray in connection with his "*exarata*." This shell is really a native of Chili, not Mazatlan! Dr. Ruschenberger collected specimens at Concepcion, which correspond exactly with Gray's figures (Beechey's Voy., Zool., pl. 39, fig. 12.) It is a more straightly conical form than *P. exarata*, differently colored outside, and having a small chestnut-brown area inside the muscle-impression; this area being much smaller than in *P. Stearnsii*, which also differs from it in the sculpture of the interior described above. Gray called his species "*mazatlanica*."

Figures of *P. Stearnsii* will be given in Mr. Stearns' catalogue of the shells collected by him during his travels in Japan, now in press.

MOLLUSCA OF THE UNITED STATES.

BY JOHN H. CAMPBELL, PHILADELPHIA.

The project of establishing a great National Collection of United States Mollusca, through the co-operation of members of the American Association of Conchologists, has been received with such favor, that it is but a question of time when the collection will be one of the finest special exhibits in the world. The Philadelphia Academy of Natural Sciences, (through its Conchological Conservator) has offered facilities for the permanent exhibition and preservation of the collection, and already a goodly number of fine shells has been received and mounted.

With the preparation and mounting of the specimens, comes the question of correctly naming them; and herein is presented the most

perplexing confusion of nomenclature. Hundreds of synonyms encumber the literature on the subject, disputes as to specific and varietal rank and even whether or not some inoffending little shell belongs to this or that genus or family, confuse the student and almost compel him to throw up his studies in despair.

The very thought of these disputes almost deferred the writer from making a beginning, but as faint heart never won fair lady, we have plunged into the work, and with the help of our colleagues throughout America will do our best to successfully carry it on. And out of this determination has grown another idea, viz.: the settlement of the nomenclature of American shells, by means of the publication, from time to time, as the shells are received, of carefully compiled catalogues of the different species arranged into genera and families and the elimination of the hundreds of useless synonyms now to be met with in "shell literature."

As everything must have a beginning, we have concluded to start the work with this number of the NAUTILUS, and taking the first family that is already represented in the Collection by all the United States species,—the Haliotidæ—give a catalogue of the species, synonymy etc., connected with it.

As a sample of the method of procedure, we will state that out of diffidence concerning our own knowledge, we have consulted such specialists as Dr. J. G. Cooper, G. W. Lichtenhaler, H. A. Pilsbry, Mrs. M. Burton Williamson, Professor Josiah Keep, R. E. C. Stearns and Henry Hemphill and after comparing the information gathered from them, have passed judgment, and committed our own views to the kind consideration of the readers of the NAUTILUS, inviting their friendly criticism, and promising them that we are sufficiently humble in spirit to cheerfully correct any errors in our lists which may be pointed out to us.

With this long preamble we present the Haliotidae, and from time to time as the collection grows and it contains the material to make comparisons, we will continue to print other lists of the same character.

FAMILY HALIOTIDÆ.

The latest monograph of the family is contained in Pilsbry's continuation of Tryon's Manual of Conchology, Vol. XII, p. 72, etc. The family contains but one genus—Haliotis.

Genus HALIOTIS Linnæus.

1. CRACHERODII Leach. Fallarones Ids. to San Diego, Cal.; Cape St. Lucas, Lower Cal.; fossil in Quaternary, San Pedro, Cal.

—Zool. Misc. 131, 1815.

Haliotis glabra Deshayes; *Haliotis glabra* Schubert & Wagner; *Haliotis Californiensis* Swainson; *Haliotis Cracherodii* Leach, var. *Californiensis* Swainson; *Haliotis interrupta* Valenciennes.

2. ASSIMILIS Dall. Monterey and San Diego, Cal., deep water only.—Proc. U. S. Nat. Mus., 1876, i, 46; Smithsonian Miscellaneous Col., vol. 19.

Haliotis (? var.) *assimilis* Dall.

3. CORRUGATA Gray. San Diego and Catalina Ids., Cal.

Wood's Index Test., Suppl., 1828.

Haliotis nodosa Philippi.

4. FULGENS Philippi. Monterey Bay, Cal. to La Paz and Cape St. Lucas, Lower Cal. Zeitschr. f. Mal., 1845, p. 150.

Haliotis splendens Reeve; *Haliotis planilirata* Reeve.

5. GIGANTEA Chemnitz. Monterey, Cal. to Kamtschatka; Japan. Conchylien Cab. X, p. 115, pl. 167, f. 1610, 1611; Gmelin, Syst. Nat. p. 3691.

Haliotis Kamtschatkana Jonas; *Haliotis gigantea* Chemnitz, var. *Kamtschatkana* (Jonas) Pilsbry.

6. RUFESCENS Swainson. Mendocino Co., to San Nicholas Id. Cal.; San Diego, Cal.; beach to 10 fathoms; fossil in Quaternary, San Pedro, and San Nicholas Id., Cal.

Catalogue Bligh Collection, Appendix p. 2, 1822.

? *Haliotis ponderosa*, C. B. Adams; *Haliotis Californiana*, Valenciennes.

List of Synonyms.

Californiana Val.=rufescens Swn.

Californiensis Swn.=Cracherodii Leach.

Discus Reeve=not found in the U. S.

Glabra Desh.=Cracherodii Leach.

Glabra Schub. & Wagner=Cracherodii Leach.

Kamtschatkana Jonas=gigantea Chemn.

Interrupta Val.=juv. Cracherodii Leach.

Nodosa Phil.=corrugata Gray.

Planilirata Reeve=juv. fulgens Phil.

Ponderosa C. B. Ad.=? rufescens Swn.

Pourtalesii Dall=not found in U. S.

Splendens Reeve=fulgens Phil.

Notes.

1. H. Pourtalesii Dall. Bull. Mus. Comp. Zool. xviii, 395, is said to have been dredged [one specimen] in 200 fathoms, near Florida Reefs, by Pourtales, in 1869, but as the specimen was destroyed in the great Chicago fire, and none has been found since, we may dismiss it from the list of United States species, especially as no other specimen or species of Haliotis is known to have been found on the East Coast of America.

2. It seems to us a pity that H. fulgens Phil. should be substituted for the well known and generally used name of H. splendens Reeve. The law of priority of description should give way in exceptional cases of merit, but as Mr. Pilsbry in Tryon's Manual has made the substitution, and some of the specialists to whom we have written agree with him, it is perhaps as well to accede to the change, so as to have the name of the shell settled.

3. A fine series of shells in the Academy collection, seems to prove that Haliotis Kamtschatkana Jonas passes imperceptibly into Haliotis gigantea Chemn. The home of the species is Japan, and it reaches its highest development there, extending northward around the Coast of Asia to the West Coast of America and reaching as far south as Monterey, Cal. getting smaller in proportion to its distance from Japan. We see no reason for making it a variety.

4. Mr. Henry Hemphill of San Diego, Cal. says of Haliotis assimilis Dall: "It has a certain aspect of its own. Its habits are different from any of the other forms, being a deep-water and not a littoral shell, while all the other Haliotis are found between tides. I have always considered it a hybrid between H. corrugata and H. splendens, on account of its having an intermediate aspect about it.

[CONTRIBUTED.]

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

DECEMBER 31, 1890.

Since last announcement the following new members have been enrolled:

124. T. H. Aldrich, Blocton, Ala. *Tertiary fossils of Atlantic Coast.*

125. Dr. Wm. H. DeCamp, Grand Rapids, Mich. *Michigan Mollusca.*

126. Wm. H. Weeks, Jr., Brooklyn, N. Y. *Bulimus* (genus).

127. Dr. Fred. Stein, Indianapolis, Ind.

128. Francisco E. Blanes, Key West, Fla.

129. Capt. W. J. Farrer, Orange, Va. *Land and F. W. Shells of Virginia.*

Mr. James H. Morrison has removed from Lexington, Va. to Luray Inn, Va.

We occasionally receive letters from members inquiring about exchanging shells. There is no obligation on the part of the members

to exchange shells. That is a matter which rests entirely with the members themselves. We would suggest, however, that members desiring to exchange specimens would announce the fact in the NAUTILUS, through the Secretary, and in that way they might add to their collections.

It is an obligation of membership to assist each other with information, where possible, and no member should hesitate to address another if he requires help in his studies. As far as possible, members desiring information upon any special point should address the members whose specialties will designate them as likely to be possessed of the requisite knowledge. A student of marine mollusca should not be asked to name Goniobases or Unionidae and vice versa. The entire range of Conchology both recent and fossil is now covered by members, and there should be no difficulty in gaining all the knowledge that can be acquired through correspondence. We have ever found the members kind and courteous, as well as patient, in answering queries and aiding us to settle disputed points. The more correspondence, the more beneficial will be the existence of the Association.

Donations to United States Collection.

The publishers of the NAUTILUS cannot give us the space to print itemized lists of all the shells received, as was done in the last two numbers, but we will continue to acknowledge from month to month, but in less extended form, the donations to the collection. The following additions to previous lists show the rapid progress of the collection.

G. W. Lichtenthaler, Bloomington, Ill.—51 species of West Coast Shells, including Triton (Priene) Oregonensis, Redf. Port Townsend, Wash.; Astralium undosum, Wood, Rincon Pt. Cal.; Sadidomus Nuttallii, Conrad, Alaska; Pecten hastatus, Sby. var. Hindsii, Cpr., Squimalt Bay, B. C.; Mures festivus, Hinds, False Bay, Cal.; Macoma secta, Conrad, Alaska; Nassa tegula, Reeve, San Diego, Cal.; Macoma inquinata, Desh., Alaska; Chama spinosa, Sby. and exogyra, Conrad; five species of Chitons; Acmaea persona, Esch., scabra, Nutt., patina, Esch. and pelta, Esch.; Solecurtus Californianus, Conrad, San Pedro Bay, Cal.; Pecten bella, Conrad, Pliocene, Santa Barbara, Cal.; and also several fine sections of shells, showing the interior structure.

C. Antoinette Shepard, New Britain, Conn.—Strophia Floridana, Dall, and Venus penita Conrad, Miocene Silex Beds, Tampa,

- Fla.; a fine suite of *Strombus bituberculatus*, Lam., Key West, Fla. and seven other Florida marine species.
- John Ford, Philadelphia, Pa.—a huge pair of *Ostrea Virginica*, Gmel., Staten Id., N. J.; *Cardium magnum*, Born, Key West, Fla.; *Asaphis deflorata*, Linn., Elbow Key, Fla.; and several others.
- Chas. Le R. Wheeler, Cape May, N. J.—Very fine, large specimens of *Fuigur carica*, Gmel and *canaliculata*, Say, from Cape May; *Cytherea convexa*, Say, same locality; *Natica duplicata*, Say and *heros*, Say, same locality, and several others.
- Joseph Willcox, Philadelphia, Pa.—A number of scarce and fossil species including *Buccinopus paralis*, Conrad, Miocene, St. Mary's Md.; *Venus tridacnoides*, Lam, Miocene, York R., Va.; *Cardium Dalli*, Heilpr., Pliocene, Caloosahatchie, Fla.; *Pecten Madisonius*, Say, Miocene, Calvert Co., Md.; *Calliostoma englyptum*, A. Ad., S. W. Fla.
- Albert Bailey, Chepachet, N. Y.—Over 20 species of land shells of Herkimer Co. N. Y., including *Helix albolabris*, Say, *monodon*, Rack., *Sayii*, Binn., *exoleta*, Binn., *elevata*, Say, *Mitchelliana*, Lea and *dentifera*, Binn.; *Vitrina limpida*, Gould; five species of *Zonites* and four of *Succinea*.
- Dr. W. S. Strode, Bernadotte, Ill.—A box of Unionidae from Spoon R., Ill., including *Union heros*, Say (very large); *ligamentinus*, Lam.; *laevisissimus*, Lea; *tuberculatus*, Barnes; *trigonus*, Lea and *rectus*, Lam. Also fine specimens of *Anodonta suborbiculata*, Say and *Margaritana complanata*, Lea.
- Wm. J. McGinty, Philadelphia, Pa.—*Unio orbiculatus*, Hildr., *Unio cylindricus*, Say; *Unio crassidens*, Lam.; and *Cooperianus*, all from the Ohio R.
- Wm. J. Raymond, Oakland, Cal.—Ten species of West Coast Shells, including *Olivella boetica*, Cooper, San Diego, Cal.; *Mopalia Hindsii*, Gray, San Francisco, Cal.; *Monoceros engonatum*, Conrad, Bolinas, Cal. and *Purpura saxicola*, Val. San Francisco, Cal.
- Uelma C. Smith, Philadelphia, Pa.—*Conus Californicus*, Hinds, San Diego, Cal.; *Nassa trivittata*, Say and *obsoleta*, Say, Atlantic City, N. J.; *Siliqua costata*, Say, Avalon, N. J. and others,—all fine suites.
- Mrs. M. Burton Williamson, University, Cal.—Very interesting suites of *Haliotis Cracherodii*, Leach and *Lottia gigantea*, Gray, San Pedro Bay, Cal.

- Philip Nell, Philadelphia, Pa.—*Physa ancillaria*, Say, and *heterostropia*, Say ; *Succinea obliqua*, Say, and *Helix hirsuta*, Say—all from Philadelphia.
- Geo. W. Dean, Kent, O.—Several species of the smaller species of land shells from Kent, Ohio, including *Zonites milium*, Morse ; *multidentatus*, Binn and *exiguus*, Stimp. ; *Helix labyrinthica*, Say, and *Pupa milium*, Gould. It is just as important to have the minute species as the larger ones and we are glad to see some of the members paying attention to them.
- John H. Campbell, Philadelphia, Pa.—*Natica Lewisii*, Gld., Puget Sd. Wash. ; *Columbella carinata*, Hinds. with its varieties, *Hindsii*, *gausipata*, *Californica*, *Gouldii* and others.
- Dr. V. Sterki, New Philadelphia, O.—Several species of *Pupa* and *Vertigo* including *Pupa Holzingeri* Sterki and *Pupa procera* Gould.
- Total, 115 genera, 242 species, 252 trays.

GENERAL NOTES.

SPECIMENS OF *SUCCINEA* AND *ANCYLUS* are desired by Prof. B. Shimek, 219 Bloomington St., Iowa City, Iowa. A large list of land, fresh-water and marine shells are offered in exchange.

AUSTRALIAN *LIMAX*. We are informed by Mr. Charles Hedley of the Queensland Museum, that *Limax Queenslandicus* Hedley is identified by Dr. Simroth as *Agriolimax laevis* Müller ; which, it seems, has established itself in Australia.—*H. A. P.*

The attention of our readers is called to the advertisement of Mr. HUGH FULTON, in this number of the NAUTILUS. Mr. Fulton was for over fourteen years, assistant to G. B. Sowerby, esq., F. L. S., of London, before commencing business for himself. Speaking from our own experience, we can as cordially recommend him to conchologists desiring foreign shells, as we do HENRY HEMPHILL to those wishing to purchase American mollusks.

PUBLICATIONS RECEIVED.

THE LOESS AND ITS FOSSILS, by Prof. B. Shimek. (from Bull. Lab. N. H. State Univ. Iowa, 1890.) This well-considered paper contains observations on the fossils of the Loess in western Iowa and eastern Nebraska. *Zonites Shimekii* has been found in Otoe Co., Neb. and Tremont Co., Iowa, localities far to the west of the original find, Iowa City, Iowa. Prof. Shimek's conclusions respect-

ing the physical conditions of the time of the Loess deposit strongly recommend themselves to us. Not much evidence of colder climate than now prevails over the same district can be derived from the fossils, which differ but slightly, when at all, from recent specimens *from the same locality*. Mr. Shimek concludes that—

The climate was comparatively uniform during the entire period, if we may judge from the fossils, for the same forms are often found from the very base, just over the drift, to the uppermost portions of deposits one hundred feet or more in thickness. No difference is noticeable between specimens of the same species from the lowermost and the uppermost portions of the deposits,—a fact which warrants us in concluding that climatic changes during the deposition of the Loess could not have been very great. The fact may here again be emphasized that while a depauperation is noticeable in some of the species, it is far from sufficient to indicate a temperature such as would be necessary to retain lakes and streams within shores of ice during the summer, and that consequently the Loess was not deposited during a glacial climate, but at a time when the temperature had moderated sufficiently to enable many land-shells, now restricted to or abundant in middle latitudes, to flourish in considerable numbers.

The great predominance of strictly terrestrial species of molluscs in the Loess indicate that during its deposition large areas of land-surface were exposed, at least during the greater part of the summer, upon which these molluscs lived and multiplied under conditions which exist now in the habitats of their modern representatives.

For the belief that the fossils as now found are not far removed from the localities in which they lived and developed, a number of valid reasons exist, the most striking of which are the following:

1. *Their usually perfect preservation* Such delicate shells as many of those under consideration could not be transported far by turbulent streams without being broken.

2. *Their distribution, both vertically and horizontally.* In many exposures of the Loess the species which to-day have the habit of remaining in considerable numbers in very restricted localities, as *Helicina occulta*, *Patula strigosa cooperi*, *Mesodon multilineata*, the *Limnææ*, etc., are likewise similarly restricted in their horizontal distribution to very narrow "pockets," though the same species may often be traced vertically for many feet, as though the shells had gradually accumulated through many generations. Again other species are more generally and more uniformly distributed in a manner which recalls their present habits, and which indicates that they have not drifted into the places in which we find them to-day,—at least not sufficiently far to disturb the arrangement with reference to each other, which we may observe in the living specimens.

The writer's conception of the climate and of the origin of the Loess, based largely upon a careful and extended study of its fossils, may be briefly summarized as follows:

I. The summers during the formation of this deposit were comparatively warm, and the glaciers had already retreated far to the north when the deposition commenced.

II. During at least a part of the summers a large portion of the area now covered by the Loess was elevated above the surface of water, as indicated by the presence of the predominating land shells.

III. These shells, too, indicate that the surface was not entirely unlike our present prairies in Iowa and Nebraska, though perhaps more moist, and more nearly level.

VI. The presence of shells of the genera *Limnææ*, *Physa*, *Planorbis*, and *Pisidium*, which are principally pond species, indicates that over this prairie surface were scattered numerous ponds and that it was traversed by quiet, sluggish streams.

V. The distribution of the shells as well as the homogeneity and fineness of the material forming the deposit indicate that the deposition was unaccompanied by violent disturbances, but that it took place quietly, and very slowly during a long period.

VI. The deposit itself was probably partly formed from sediment carried over portions of the surface by quiet overflows of the sluggish streams which had not yet deeply cut their channels. The numerous ponds, however, fed by the drainage in their immediate vicinity, were also receiving with this the finer material gathered from the glacial drift surrounding them. This material being like that gathered by the streams, would form similar deposits, each pond or swamp forming in this way a bed of Loess. The changes in the level of water in the ponds would produce a change in the extent of the muddy flats along their shores, thus facilitating the distribution of the terrestrial shells. These ponds and streams, by shifting about through the combined influence, of floods and drouths, extended the distribution of the sediment, and subsequent erosion completed the work necessary to produce the present topography.

THE NAUTILUS.

VOL. IV.

FEBRUARY, 1891.

No. 10.

FORMS OF AMERICAN CARYCHIUM.

BY H. A. PILSBRY.

The forms of *Carychium* found in America have all been referred to the one species *exiguum* by Mr. Binney. In examining a series collected by Mr. Geo. W. Dean of Kent, Ohio, referred to me by my friend John Ford, I found a certain form which Mr. Dean considered distinct. It is far more slender than ordinary *exiguum*. The amount of difference is considerable, and only the extreme minuteness of the shells has prevented conchologists generally from recognizing it. One conchologist however, *has* done so:—Henry Carey Lea, Apostle of microscopic shells! The forms may be distinguished thus:

C. exiguum Say, (typical). Rather cylindrical, the next to the last whorl nearly equaling the last in diameter; mouth one-third (or more) the length of shell; outer lip thickened, expanded, sometimes obsoletely thickened, scarcely toothed, in the middle. This is by far the most abundant and generally distributed form.

C. exiguum var. *exile* H. C. Lea. Much slenderer than the preceding, longer, more distinctly striated; mouth smaller, less than one-third the total length of shell; outer lip thickened, often distinctly toothed in the middle. Specimens described are from Kent, Ohio.

C. exiguum var. *occidentalis* Pilsbry. Somewhat larger than typical *exiguum*, *distinctly conical*, not at all cylindrical, acute; outer lip expanded, thin, not at all toothed. It is from Portland, Oregon.

The writer proposes to figure the forms later. I may say that Mr. Ford concurs with me in the arrangement of varieties here offered.

The entire series of American *Carychium* is closely allied to *C. minimum* of Europe, and doubtless sprang from the same circum-polar stock.

NOTES ON MR. HEMPHILL'S CATALOGUE.

BY CHAS. T. SIMPSON.

In a late number of THE NAUTILUS the editor¹ called attention to the catalogue of shells recently issued by Mr. Henry Hemphill, (in which he has made a considerable reduction in the number of species) and asked for the opinions of students throughout the country. As Mr. Hemphill is known to all to be a most careful collector, and a close observer of the facts connected with the lives and surroundings of Mollusks, such a reduction by him of the number of our hitherto acknowledged species is, as has been remarked, rather startling, and is, on account of the prominence of its author entitled to at least careful consideration.

It seems to me that the time is near at hand for quite a change in our ideas concerning the classification of the forms of organic life and their variations. The old idea which has so long prevailed, that species were formed by an act of creation, fixed and unchangeable, as coins are stamped out at a mint; that genera and higher groups have an invariable limit, is fast becoming obsolete, and we are being daily forced by stubborn facts to learn that variation is the rule and fixity the rare exception, that the limits of species and the higher groups of forms are very often vague, or so absolutely uncertain as to be impossible to define. By far the greater number of scientists believe in the theory of evolution in some form or other, and hold that all the existing animals and plants are but the direct descendants of other and extinct species, that the infinite variation which is found is caused largely by environment and other circumstances connected with the life of the organism. In the United States we should expect to find an excellent field for such variation.

¹ The article on Mr. Hemphill's Catalogue to which allusion is made was not written by the Editor. It was contributed by the officers of the American Association of Conchologists.—ED.

Its continental area, its diversity of climate from the boreal regions of the British possessions to the very borderland of the tropics, its wide stretches of plains, varying from forest covered to entirely naked, the difference in the height of its mountains, its areas of almost perpetual humidity which shade out into desert regions, would give just the conditions necessary for the wide distribution of species, and for great and gradual variation. Such wide distribution and variation we find with most of our forms of mollusks.

Various methods have been proposed by which these lesser variations may be designated. Some have classed them as varieties of species, giving to each a varietal name, others have resorted to lettering or numbering, while the ornithologists of America class them as sub-species. The New School of Conchologists of Europe seeks a way out of the difficulty by applying specific names to a great many of the minor variations, and generic names to small and ill-defined groups of species. Unfortunately for such systems of nomenclature, variation does not always occur in a lineal direction, or in other words, from one genus or species directly to another, but often seems to be broken up so that certain forms or groups combine the characters of several other forms or groups, and appear very much like hybrids.

In the wonderful series of *Patula*, beginning with elevated shells with rounded whorls and strong radiating ribs known as *Helix Idahoensis* which varies gradually through the less elevated and smoother forms of *Cooperi* and *strigosa*, to *Hemphilli* and *Haydeni* which are lenticular and sharply keeled with strong revolving sculpture, we find such irregular varieties or natural hybrids, which hardly admit of naming. Elevated forms are not rare, having radiating sculpture and sharp keels, in others of the same general form the ridges are revolving, thus partaking more or less of the characters of *Idahoensis* and *Hemphilli*; and greatly flattened shells are met with, without keels and with more or less decussated or even radiating sculpture, in fact in the 1500 or more specimens of this protean form in the collection of the National Museum, one can observe this crossing of characters in almost every direction. To attempt to designate these hybrids, if such they are, by name is simply an impossibility. The argument is put forth by many that it is better to give any form a name than to have to describe it every time, it is mentioned, but to carry it out one could apply fifty names to the variations of *Melongena corona* or *Cyrena Floridana*, or twice that

number to the color varieties of *Oliva inflata*, *Helix picta* or *varians*, and to designate all the forms of the above mentioned group of *Patula* would seriously tax the brain of the most ardent devotee of New School doctrines.

Another way out of the difficulty is by throwing together under one name those things which cannot be separated, as Fischer has done to some extent with genera, and Tryon with species. The consolidation by Dr. Dall of *Helix microdonta*, *Febigeri*, *septemvolva*, *Carpenteriana* and *cereolus*, under the latter and older name; the union of the group of *Patulas* I have mentioned under a single appellation, and Mr. Pilsbry's somewhat startling announcement putting such genera as *Mesodon*, *Polygyra*, *Triodopsis* and *Stenotrema* into one group, are examples which I believed are approved by the good sense of a majority of American Conchologists. Mr. Hemphill has simply gone a little farther in the direction which these gentlemen have moved, and I believed there is a wide field here in the United States for further work in the same way. I do not believe in naming or holding on to names for those things which have neither beginning nor end.

EDIBLE MOLLUSKS OF MAINE.

BY HENRY WINCKLEY.

As a supplement to the article by Prof. Keep in the January NAUTILUS, and in accordance with his suggestion, Maine responds to California with the following list of Mollusks found in the markets.

Ostrea virginica (Gmel). As in all Eastern States this is by far the most popular food mollusk; they are obtained from the South, *i. e.* from Providence to Norfolk, Va. There is a small bed of living oysters in the Sheepscote River, some fifteen miles from the sea, and occasionally a few are obtained and eaten by some energetic individual; they are not numerous and hence do not find their way to the markets.

Mya arenaria Linn., is largely used and abounds everywhere along the coast. It is an inexpensive food and used by all classes. Large quantities are canned.

Pecten tenuicostatus Mighels & Adams. This last species is quite an important article of food in the winter season, and probably is not found in any market to the south of this state. It has as a rival the popular *Pecten irradians* imported from Long Island Sound, but is common in our markets.

Mastra solidissima Chemnitz. The presence of this species in the market is somewhat dependent upon the storms. Some weather brings them out and at such times they can be bought. They occupy a place in the mollusks like that of game birds among the feathered population, very popular and when obtained in small quantities, as is frequently the case, it gets no further than the table of the finder, who rejoices over his good work. It is much prized.

Venus mercenaria Linn. Occurs at one spot on the coast, I have not seen it in the markets, whether it is occasionally used or not I am not sure.

In addition to the above, I do not know of any that can be reported as commonly used. Others are found; the edible muscle abounds, but is not sold. *Solen ensis* sometimes makes a meal for a lucky man who chances to obtain a sufficient quantity, but these are chances rather than regular market food.

LIST OF MOLLUSCA OF GLOUCESTER CO., N. J.

BY WM. J. FOX.

The following list includes all the species of Mollusca collected in Gloucester Co., N. J. from June to September, 1890. It is without doubt far from being complete, as my specialty being Insects, I could devote but little time to collecting shells. Southern New Jersey being but little frequented and unprofitable to shell collectors, being for the most part sandy soil, this list may prove of some interest to the readers of the NAUTILUS. For the determination of these species, I am indebted to Mr. H. A. Pilsbry.

LIMACIDÆ.

Limax sp.

Zonites ligerus Say, var. *Stonei* Pilsbry.

Zonites arboreus Say.

Zonites radiatulus Alder.

Zonites indentatus Say.

Zonites minusculus Binn.

Zonites suppressus Say.

HELICIDÆ.

Patula striatella Anth.

Patula lineata Say.

Punctum pygmaeum minutissimum Lea.

Helix thyroides Say.

Helix albolabris Say.

PUPIDÆ.

Pupa contracta Say.

Vertigo sp. (juv.)

SUCCINEIDÆ.

Succinea avara Say.

Succinea obliqua Say.

Succinea ovalis Gould.

LIMNAEIDÆ.

Limnæa catascopium Say.

Limnæa humilis Say.

Planorbis trivolvus Say.

Planorbis bicarinatus Say.

Planorbis parvus Say.

Planorbula armigera Say.

Ancylus rivularis Say.

PHYSIDÆ.

Physa ancillaria Say.

AURICULIDÆ.

Carychium exiguum Say.

VIVIPARIDÆ.

Campeloma decisum Say.

Lioplax subcarinata Say.

AMNICOLIDÆ.

Amnicola limosa Say.

Amnicola grana Say.

Pomatiopsis lapidaria Say.

Somatogyrus altilis Lea.

VALVATIDÆ.

Valvata bicarinata Lea.

STREPOMATIDÆ.

Goniobasis virginica Gmel.

CORBICULIDÆ.

Sphaerium transversum Say.*Sphaerium striatinum* Lam.*Pisidium virginicum* Gmel.

UNIONIDÆ.

Unio complanatus Sol.*Unio cariosus* Say.*Unio nasutus* Say.*Anodonta Tryonii* Lea.

A CATALOGUE OF CONCHOLOGICAL ABBREVIATIONS.

BY F. C. BAKER, ROCHESTER, N. Y.

G.

Garr. or Grt.	Garrett, Andrew.	American.
Gld	Gould, Dr. A. A.	American.
Gmel.	Gmelin, J. F.	German.
Greg.	Gregorio, Antonio de.	Italian.
Gundl.	Gundlach, J.	Cuban.
Guild.	Guilting, L.	English.
Gut.	Gutierrez.	Cuban.

H.

H. & J.	Hombron & Jacquinot.	French.
Hald.	Haldeman, S. S.	American.
Hanl.	Hanley, Sylvanius.	English.
Hartm.	Hartmann, D. W.	Swiss.
Heyn.	Heynemann, D. F.	German.
Hds.	Hinds, R. B.	English.
Hombr.	Hombron, M.	French.
Humph.	Humphreys, J. D.	English.
Hutt.	Hutton, F. W.	English. New Zealand.

J.

Jacq.	Jacquinot, H.	French.
Jeffr.	Jeffreys, J. G.	English.
Jouss.	Jousseau, Dr.	French.

K.

Kien.	Kiener, L. C.	French.
Kregl.	Kreglinger, G.	German.
Küst.	Küster, H. C.	German.

L.

Lam.	Lamarek, M. le Chev.	French.
Lindstr.	Lindstrom, G.	Danish.
Linn.	Linné (Linnæus,) Carl von.	Swedish.

M.

Mab.	Mabille, M. P.	French.
Mart.	Martyn, Thos.	English.
Midd.	Middendorf, A. T. von.	Russian.
Mich.	Michaud, A. L. G.	French.
Migh.	Mighels, J. W.	American.
Mke.	Menke, C. T.	German.
Mtg. or Mont.	Montagu, G.	English.
Montf.	Montfort, Denys de.	French.
Montr.	Montrouzier, M.	French.
Monts.	Monterosato, M. di.	Italian.
Mouss.	Mousson, A.	French.
Moq.-Tand.	Moquin-Tandon, A.	French.
Müll.	Müller, O. F.	German.

N.

Newc.	Newcomb, Dr. Wesley.	American.
Nutt.	Nuttall, Thomas.	English.

P.

Payr.	Payraudeau, P. C.	French.
Parr.	Parreyss, Dr.	German.
Pfr.	Pfeiffer, Dr. Louis.	German.
Phil.	Philippi, Dr. R. A.	German.
Pse.	Pease, W. Harper.	American.

Q.

Q. & G.	Quoy & Gaimard.	French.
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R.

Raf.	Rafinesque, C. S.	French-American.
Redf.	Redfield, John H.	American.
Rossm.	Rossmässler, E. A.	German.
Rve.	Reeve, Lovell.	English.

S.

Schum.	Schumacher, C. J.	German.
Sowb. or Sby.	Sowerby, G. B.	English.
Shuttl.	Shuttleworth, R. J.	German.
Spengl.	Spengler, L.	German.
Stimp.	Stimpson, W.	American.

T.

Theob.	Theobald, W. Jr.	English.
Trosch.	Troschel, F. H.	German.

V.

Val.	Valenciennes, M. A.	French.
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W.

Wein.	Weinkauff, H. C.	German.
Woll.	Wollaston, T. V.	English.
W. G. B.	Binney, W. G.	American.

[CONTRIBUTED.]

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

JANUARY 21, 1891.

Since last announcement the following new members have been enrolled:—

130. John Brady, Aledo, Ill. *Unionidæ*.

131. John H. Britts, Clinton, Mo. *Carboniferous Palaeozoic Mollusca*.

132. Delos Arnold, Pasadena, Cal.

133. A. W. Hanham, Brantford, Ont. *Canadian Land and Fresh Water Mollusca*.

134. Mrs. J. M. Gaige, Detroit, Mich. *Muricidæ*.

135. Mrs. Amos O. Osborne, Waterville, N. Y. *Land and Fresh Water Shells.*

136. Mrs. Mary P. Olney, Spokane Falls, Wash.

137. Berlin H. Wright, De Leon Springs, Fla. *Unionidæ of Gulf States.*

138. Anna Goodsell, Poughkeepsie, N. Y.

The following members have chosen subjects:—

Dr. Fred. Stein, Indianapolis, Ind. *Air-breathing Mollusks of U. S. and Europe.*

Francisco E. Blanes, Key West, Fla. *Marine Mollusca of Florida and Cuba.*

Ida M. Shepard, Long Beach, Cal., has changed her subject from *West Coast Shells* to *West Coast Marine Shells and Helicidæ.*

G. W. Lichtenthaler is now upon a visit to California, where he will doubtless add to his already extensive knowledge of West Coast Shells.

Joseph Willecox and Uselma C. Smith, of Philadelphia, are traveling in Florida at the present time.

C. A. Hargrave, Danville, Ind., has accepted the editorship of the Department of Conchology in "The Observer," published in that city. He is a good conchologist, and will no doubt make his department a success.

Henry A. Ward, Rochester, N. Y., is about to pay a visit to Cuba and Jamaica on a natural history quest.

Ida M. Shepard, Long Beach, Cal., will shortly start upon a two months' collecting tour in the Gulf of California.

Mrs. S. H. Young has changed her residence from Long Beach, Cal., to Butler, Pa.

Rev. H. W. Winkley, Saco, Me., writes: "I am delighted with my experience in the Association. I have exchanged with several, received letters, etc. They all seem to have the same interest in Conchology that I have."

Chas. Schuchert, Albany, N. Y., is preparing a "Bibliographical Catalogue of American Fossil Brachiopoda." It is a much-needed work, and is in thoroughly competent hands.

Members desiring to have any Cypræas named, will please mail them to the President, who will take pleasure in naming and promptly returning them. Of course no charge will be made.

The pleasure of assisting members will be a sufficient recompense to him.

Donations to the United States Collection.

The collection is progressing wonderfully, and it is a source of much gratification to note the general interest evinced by members, and the receipt of such fine specimens as are sent. Some of the specimens and suites sent are superb. Since last acknowledgment, the following have been received, mounted, and placed in the cases:—

O. A. Crandall, Sedalia, Mo.—More than 20 species of Land Shells from Missouri, Arkansas and Texas, including *Goniobasis sordida*, Lea; *Saffordi*, Lea, and *Crandalli*, Pilsbry; *Helix inflecta*, Leaii, *Dorfeuillana*, var. *Sampsoni*, Weth., *appressa*, *elevata* and *Roemeri*; *Pupa fallax*, Say, and *armifera*, Say; and *Sphaerium striatinum*, Lam.

Rev. H. W. Winkley, Saco, Me.—12 species of New England Shells, including *Aplexa hypnorum*, Linn.; *Segmentina armigera*, Say; *Cryptodon Gouldii*, Phil.; *Macoma Baltica*, Linn.; *Littorinella minuta*, Totten; *Gemma gemma*, Totten, and *Helix pulchella*, Müll.

John Ford, Philadelphia, Pa.—*Nerita peleronta*, Linn, Key West, Fla., and a fine suite of *Oliva litterata*, Lam., from S. W. Florida.

J. A. Singley, Giddings, Tex.—Over 30 species of Texas Land Shells, and 12 species of Texas Tertiary Fossils, including fine suites of *Bulimulus alternatus*, Say, and *Holospira Goldfussi*, Menke; *Helix Texasiana*, *leporina*, *Berlandieriana*, Copei, *labyrinthica*, *Henriettae*, *Cragini*, *Mooreana*, and *thyroides*; *Zonites Singleyanus*, *minuscule* and *friabilis*; *Helicina tropica*, Jan.; *Goniobasis Comalensis*, Pilsbry; *Physa Sayii*, *Forshyei* and *Halei*; *Amnicola peracuta*, Pilsbry and Walker; *Pisidium compressum*, Prime and *Sphaerium subtransversum*, Prime.

Chas. LeR. Wheeler, Cape May, N. Y.—Additional examples of *Fulgur canaliculata* and *carica* (magnificent specimens); *Natica heros*, Say; *Dosinia discus*, Reeve, Swansboro, N. C.; *Pholas truncata* and *Zirphaea crispata*, Linn., Cape May, N. J.

E. H. Harn, Blairsville, Pa.—*Helix profunda*, Say, and *Pennsylvanica*, Green.

- II. Moores, Columbus, O.—*Helix multilineata profunda*, monodon, exoleta, fallax and albolabris from Columbus, Ohio; two species of *Pomatiopsis* and two of *Amnicola*.
- E. W. Roper, Revere, Mass.—A very valuable series of *Pisidium* and *Sphaerium*, ranging from the youngest to the oldest forms, including *Sphaerium secure*, *rhomboideum*, and *partumeium*; *Pisidium Idahoense* (his new species), *variabile*, *compressum* and *abditum*. Also a fine series of *Purpura lapillus*, Linn.
- Chas. W. Johnson, Philadelphia, Pa.—Fine suite of *Melongena corona*, Gmel., from S. W. Florida; *Succinea effusa*, Shuttl. Ocklawaha River, Fla., and *Helix pustula*, Fér., St. Augustine, Fla.
- Dr. V. Sterki, New Philadelphia, O.—Pupa *rupicola*, Say, and *Vertigo rugosula*, var. *ovulum*, Sterki, both from Volusia County, Fla. Also an interesting lot of *Unios* from the Tuscarawas River, Ohio, including *Unio luteolus*, Lam.; *multiradiatus*, Lea; *phaseolus*, Hildr; *lens*, Lea; *pustulosus*, Lea; *subrotundus*, Lea; *pyramidatus*, Lea; *coccineus*, Lea; *rubiginosus*, Lea; *irroratus*, Lea; *triangularis*, Barnes, and *undulatus*, Barnes. Also 3 species of *Margaritana* (*Alasmodonta*), and 4 species of *Anodonta*.
- Total, 138 genera, 352 species, 402 trays.

GENERAL NOTES.

ARIOLIMARY COLUMBIANUS VAR. STRAMINEA. Animal when extended about six inches long, with the marking of *A. Columbianus*, of a uniform light straw color, a shade lighter beneath the foot. Habitat, Santa Cruz Island, California.—*Henry Hemphill*.

NOTES ON CERTAIN SPECIES OF CEPOLIS. In the *Manual of Conchology*, 2d. series, vol. V, the writer described as new, under the name *Helix pimesoma*, a Haitian shell which proves to be the same as the unfigured *H. trizonaloides* A. D. Brown, as I have satisfied myself by finding Brown's types with his original label, in the collection of Mr. John H. Campbell, Philadelphia. I may also note here that *Helix squamosa* Fér. placed in *Cepolis* in the *Manual*, is really a species of *Jeanneretia*,—a section having apparently no especial affinity to *Cepolis*.—*H. A. Pilsbry*.

THE NAUTILUS.

VOL. IV.

MARCH, 1891.

No. 11.

NOTES ON THE SCULPTURE OF AMERICAN LIMNÆAS, ETC.

BY ROBT. E. C. STEARNS.

In several instances parties who have sent specimens of American Limnæas to the U. S. National Museum for identification, have called attention to the sculpture of the specimens, as if this character was peculiar to the examples sent by them, and not previously observed; hence the following notes which may be of some use in connection with the study of pond-snails, by beginners in this class of molluscan forms.

The extensive geographical series, and numerous examples in the National Collection show the sculpture characters to be as follows, and that all of the so-called species, of which without doubt there are at least "twice too many," exhibit in a greater or less degree when a large geographical series is brought together, with an ample representation of individuals, the same aspects of sculpture variation.

FIRST. The longitudinal incremental or growth lines are often conspicuously developed in forms that generally are smooth or with scarcely discernible growth lines, and occasionally individuals are met with in which there is apparently a serial or alternating arrangement of bands or zones of fine and coarse growth lines, suggestive of a positive longitudinal sculpture, which we may suppose to be due to a more vigorous growth at one season than another. Again the larger whorls often exhibit a tumid or bulging elevation or prominence which is rarely or seldom regular, usually irregular in occurrence, and not infrequently so conspicuous as to produce absolute

distortion, as if a season of moderate food supply had been followed by an aldermanic dinner or two, resulting in sudden and phenomenal growth followed by a penitential period of more temperate eating.

These bulgings as before stated, seldom if ever exhibit any regularity of occurrence in the *Limnæas*; they often do, however, in the nearly related pond snails *Planorbis* and *Physa* as may be seen not infrequently in *Planorbis glabratus* wherein they seem to occur in somewhat orderly sequence. In the beautiful little *Physa* (*Costatella*). *costata* described by my venerable friend Dr. Newcomb, a form which inhabits Clear Lake, California—these bulgings are numerous and regular and are arranged nearly equidistant and give a positively *sculptured aspect* to the shell, in distinction from the suggestion of *pathologic eccentricity* like the bulgings of the *Limnæus* and many of the *Planorbis*.

The above variation in strength or prominence of growth or incremental lines, as they are usually called, is also common to many of the *Planorbes*, notably in *P. corpulentus* Say, from the West coast, and is also frequently exhibited in examples of the curious and interesting genus *Carinifex* another West coast form from Eagle Lake, California and elsewhere, and in the equally curious little shells of the genus *Pompholyx*; that enterprising and intelligent collector Henry Hemphill detected a pretty costate variety at the Dalles of the Columbia River, wherein the ribs are quite evenly placed and suggestive of frequent variceal thickening as in some of the *Strophios*.

Many of the land shells of North America, as well as exotic species, exhibit varying aspects or facies of incremental sculpture, and many who read this will at once call to mind the difference, in this respect, of examples of *Mesodon* of the same species from different localities, also of *Patula alternata*, and the remarkable sculptural diversity of the forms now included with *Patula strigosa* and its synonyms. There are other groups of the *Helicidæ* which might be included, but these are sufficient for the purposes of illustration and among the *Bulimulidæ* we have no lack of instances, and the group *Strophia* of the *Pupidæ*, which has led Mr. Maynard into a sort of conchological quick-sand or "slough of despond," furnishes a further appropriate illustration.

SECOND. Inclusive of the first or above class of variation, we have the dented or malleated aspect of sculpture, as if the shell had received a succession of light blows from a small hammer, blows

carefully given with sufficient force to dint the surface without breaking the substance of the shell. These dints are sometimes quite regular in arrangement and frequently have the aspect of zones following the basal and previous whorl transversely and parallel to the sutural line, like so many flat bands.

This form of sculpture is also met with not only in related groups like the *Physas*, often conspicuously shown in the form to which the late Dr. Lea gave the name of *P. Carltoni* as well as in other species of the same genus; frequently in *Planorbis* and *Carinifer* as well as in the river-snails *Ampullaria* and in the *Bulimi* among the land shells.

THIRD. Another and not infrequent aspect of sculpture is exhibited by several species, and consists of fine close set incremental lines crossed by transverse, somewhat waved and slightly incised grooves; the same character of sculpture is not infrequent in many terrestrial pulmonates. The Mexican *Glandinas*, for instance, furnish in several species, beautiful examples of this delicate tooling of the surface, to use a familiar mechanical term.

Mr. Dall recently collected several specimens of *Limnæa palustris* in the irrigation ditches near the Hot Springs in Honey Lake Valley, Lassen Co., California, (within the area of the extinct tertiary Lake Lahontan), which exhibit this form of sculpture markings. It is often if not generally present in the following species:

Limnæa lepida Gould, *Limnæa ampla* Mighels, *Limnæa Sumassi* Baird; and less frequently so far as I have observed, in *Limnæa columella* Say, *L. caperata* Say, and *L. lanceata* Gould. Doubtless many others of the numerous alleged species of this genus, occasionally exhibit this character of sculpture, which is seen in examples of all of those I have named even from widely separated areas.

It should not, however, be inferred that sculpture variation has any special or direct relation or connection with geographical distribution; that it has indirectly, in the *Limnæas* and the class of Mollusks to which said group belongs, there is no doubt, for it will at once come to the mind of any one familiar with the pond snails of all countries, that those inhabiting semitropical and tropical areas are much more constant or uniform in size, shape and sculpture than their fellows of the same kin from northern or colder latitudes, and the texture of the former is much finer and smoother on the whole, or all in all, than the forms that live in the cooler regions of the north. The influences that appear to induce, or cause variation

are environmental rather than geographical; and following in the general line or trend of this paper may be presented on another occasion.

NOTE ON GONIOBASIS CATENARIA SAY.

BY H. A. PILSBRY.

Having occasion recently to name some Florida *Goniobases*, the writer examined thoroughly the species described from that State. The characteristic type is *G. catenaria* Say. It is a turritid shell, blackish-brown or olive-brown, having numerous small folds extending from the suture to the angular periphery, crossed by two or three spiral threads, which form beads where they cross the folds; the periphery is more or less keeled and tuberculate; below it are a variable number (4-7) of spiral raised threads. The apex is eroded.

The sculpture is sometimes nearly obsolete, as in a blackish form collected in Marion Co. by Mr. G. W. Webster, and also sent me by Mr. Berlin H. Wright; or it may be very sharp and clear-cut, as in a beautiful form from Alexander Spring Co. The following synonymy I regard as unquestionably established:

G. catenaria Say, 1822. *G. Etowahensis* Lea, 1861.

G. subvirata Conr., 1850. *G. papillosa* Anth., 1861

G. Floridensis Rve., 1860. *G. Downieana* Lea, 1862.

Of the names given below, I have seen neither *G. Bentoniensis* or *G. Couperii*, but they seem to have very slight differential characters. *G. Hallenbecki* and *G. Boykiniana* are practically the same thing, as the suite before me shows. They differ from the *catenaria* in nothing but size. These four names may therefore be ranked as probable synonyms, or at best, species on probation:

G. Boykiniana Lea, 1840, + *G. Hallenbeckii* Lea, 1862.

G. Bentoniensis Lea, 1862.

G. Couperii Lea, 1862.

All of which is respectfully submitted. Notes on any of these forms from collectors will be very acceptable to the writer.

The specimens studied are in the general collection of the Academy of Sciences and the collection of the American Association of Conchologists.

UNIONIDÆ OF GA., ALA., S. C., AND LA., IN SOUTH FLORIDA.

BY S. HART WRIGHT, PENN YAN, N. Y.

An interesting fact in geographical distribution is noted in the finding of Unionidæ in Central and Southern Florida, which belong to, or were originally described as from the Central States of the South. In Volusia County, Fla., over one hundred miles south of Jacksonville and more than three hundred miles south of the middle portions of Ga. and Ala., several species of *Unio* have been found which were described from the latter States, or from S. C.

The St. Johns River flows northward past Volusia County, to Jacksonville and the Atlantic Ocean; and the introduction of Ga., Ala. and S. C. species against the current of the river for so great a distance is remarkable. Although the Unionidæ have locomotion in a slight degree and might make headway against rivers and creeks, when once in them, they cannot thus get into waters which do not connect. Their introduction into remote regions may be through the agency of water-birds, which might carry juveniles long distances, and then drop them into new stations.

We found in Volusia Co., Fla., in 1887, the following species supposed to be transplanted from Georgia: *Unio Dariensis* Lea, *U. cicur* Lea and *Anodonta Couperiana* Lea, perhaps the most beautiful *Anodonta* in America, and the only one found in Florida of which we have any knowledge. We also found there, *U. modioliformis* Lea and *U. angustatus* Lea, both from South Carolina. Mr. Charles T. Simpson found in Manatee County, one hundred and fifty miles farther south and on the west side of the state, *U. obesus* Lea and *U. granulatus* Lea, from Ga. and Alabama. Mr. George W. Webster sent us a few weeks ago, a species he found in Lake Co., west of Volusia Co., which proved to be *U. hepaticus* Lea, from Ga. and S. C. *U. opacus* Lea, from Ga. and *U. nigerrimus* Lea, from La. have been reported from middle Florida. None of the species indigenous to Southern Florida, so far as we can learn, have ever been found in any of the other Southern States.

NOTES ON THE CLASSIFICATION OF AMERICAN LAND SNAILS.

BY H. A. PILSBRY.

Since the publication of my Check-list of American Land Shells, many new forms (species, varieties and absolute synonyms) have

been described, and various obscure question in phylogeny and classification have become more clear to me. It is my purpose to discuss these matters in a series of short papers.

Fischer has divided the suborder Geophila (=Stylommatophora) or stalked-eyed Pulmonates into two main branches, *Monotremata* and *Ditremata*. It seems to me that a more fundamental separation is indicated by the presence or absence of a jaw, together with the modifications accompanying this character. I would therefore primarily divide the land pulmonates into *Agnatha* and *Gnathophora*.

SUPERFAMILY AGNATHA.

No jaw; teeth of the radula arranged in very oblique V-shaped rows, all of them of the aculeate or thorn-shaped form, the side-teeth larger than the central tooth, which is often obsolete.

The families of *Agnatha* are as follows.¹

I. Mantle small, posterior; shell rudimentary or developed; a common genital orifice *Testacellidæ*.

II. Mantle enveloping the whole upper surface; no shell; genital orifices separated *Rathouisiidæ*.

The last named family is identical with the genus *Vaginulus* as understood by Stoliczka and Binney; not *Vaginulus* Fér., which as Férussac himself says has a jaw. *Veronicella* Blainv. and authors, is the same as *Vaginulus* Fér.

The *Rathouisiidæ* have been found only in India and China.

The *Testacellidæ* comprise a great variety of forms. The family is practically world-wide in distribution in tropical and subtropical regions.

Genus GLANDINA Schum.

Additional species and varieties.

G. truncata Gm., form *ovata* Dall. A short form, measuring 44 x 25 mm. Pliocene of the Caloosahatchie.

How does it differ from *bullata* Gould?

G. truncata Gm., form *macer* Dall. Long, narrow, but not parallel-sided, 75 x 20 mm. Recent, and fossil in the Caloosahatchie beds.

Like the form *parallela* W. G. B., these are doubtless only the extreme aspects of variation in a very mutable species.

¹ Fischer recognizes but one family, *Testacellidæ*; ignoring the agnathous *Vaginulus*-like forms.

SUPERFAMILY GNATHOPHORA.

Jaw present.

I. Orifices of genitalia contiguous or united *Monotremata*.

II. Orifices of genitalia widely separated; no shell; mantle covering the whole upper surface *Ditremata*.

The *Monotremata* divide naturally into two divisions:

1. Lateral teeth of the aculeate or thorn-shaped type *Vitrinea*.

2. Lateral teeth of the quadrate type *Helicea*

1. Families of *Vitrinea*.

a. All of the teeth aculeate *Selenitidæ*.

b. Central and lateral teeth quadrate, uncini aculeate *Limacidæ*
Selenitidæ.

This family is not very distinct from *Limacidæ*, but the radula is more highly specialized. Of the genus *Selenites* numerous varieties and forms have been described since the publication of my check-list. They will be enumerated later.

Limacidæ.

All attempts to split this group into two or more families have proved impracticable. The various genera exhibit every stage in the degeneration of the shell. The presence or absence of a caudal mucus gland is equally unreliable, for genera otherwise closely allied, vary in this character.

The additions to our *Limax* list being unimportant will be deferred.

Additional species of *Zonites*.

Z. Shimekii Pilsbry. Loess formation of Iowa and Nebraska.

Z. Simpsoni Pilsbry. Indian Territory.

A NEW SPECIES OF ARCONAIA.

BY H. A. PILSBRY.

Unio (Arconaia) Provancheriana sp. nov.

Shell wide, oblong, beaks at the anterior third. The whole shell twisted, very strongly resembling *Area (Parallelopipedum) tortuosa* L., in the direction and degree of the twist. Hinge-line sigmoid. Anterior and posterior margins rounded; basal margin gently

curved, sigmoid: epidermis strong, olive-brown with a few darker concentric streaks; concentrically striate, nearly smooth. The left valve has a slight ridge extending from the beaks to the posterior extremity. Cavity of the left valve very shallow, of the right valve deeper; naere purplish flesh-colored. The left valve has two widely separated cardinal teeth, lateral teeth remote from cardinals, double; right valve with single cardinal and lateral teeth. Height 32, width 53½, thickness 18 mill.

The specimen is said to be from China. It is from the collection of l'abbé Provancher, Cap Rouge, Quebec.

The ends are not produced as in *A. contorta* Lea, nor is the shell bow-shaped like that species. It can be compared with none other known to me.

[CONTRIBUTED.]

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

FEBRUARY 23, 1891.

Since our last announcement the following new members have been enrolled:

- 139. E. R. Mayo,¹ Boston, Mass. *Massachusetts Mollusca.*
- 140. R. T. Shepherd, Piqua, Ohio. *Unionidae.*
- 141. Elwood Pleas, Dunreith, Ind. *Indiana Mollusca.*
- 142. Hale Montgomery, Clinton, Mo.

Nearly all of the North American Conchologists and many Palaeontologists are now enrolled in the Association, the progress of which has been very gratifying. The members are taking advantage of their privileges to correspond with each other, and much special study has been accomplished. Several of the members have undertaken the preparation of lists of species, similar to the list of Haliotidae recently published by the President. A list of the American Cypræidae (fossil and recent) is now ready, but for want of room, will not appear until next number. Several other lists are approaching completion and we trust that it will not be long before we have complete lists of all North American mollusks.

The United States Collection.

The collection of United States shells, now being formed by the members is growing very rapidly. Many species have been added

¹ Deceased since his election.

during the past month and the specimens and suites received are magnificent. It should be borne in mind :

1st. That donating to the Collection is purely a voluntary matter on the part of members.

2d. That none but the finest kinds of specimens are accepted.

3d. That all shells must have the localities accurately designated.

4th. That consignments should be forwarded to the President, care of Academy of Natural Sciences, 19th and Race Sts., Philadelphia, at which institution the Phila. members of the Association meet at intervals, and prepare, label and mount the shells for permanent exhibition.

To avoid duplicating, it would be well for members to forward to the President lists of such shells as can be sent and he will erase the names of the species already received, and return the lists to the senders.

Donations to United States Collection.

Since last announcement, the following have been mounted and placed in the Collection. [Names of donors annexed.]

H. Moores, Columbus, Ohio.—

A lot of fresh-water shells including 12 species of Strepomatidae; 3 of Paludina; Sphaerium solidulum and transversum; Pyrgula Nevadensis, Stearns; Bythinella obtusa, Lea and Limnaea humilis, Say and exilis, Say. Also Helix clausa, Say.

E. R. Mayo, Boston, Mass.—

16 species of Marine Shells of New England, including Astarte sulcata, Costa, and castanea, Say; Chrysodomus decemcostatus, Say; Buccinum undatum, Linn. and ciliatum, Fabr.; Leda limatula, Say and thraciaeformis, Storer; Natica flava, Gld. and canaliculata, Gld., and Pecten Magellanicus, Lam.

J. A. Singley, Giddings, Tex.—

8 species of Eocene fossils from Moseley's Ferry and Wheelock, Tex., including Surcula Desnoyersii, Lea and Buccitriton Texanum, Gabb.

John Ford, Philadelphia, Pa.—

Anodonta Tryonii, Lea; Martesia cuneiformis, Say; and Lioplax subcarinata, Say.

Wm. J. Fox, Philadelphia, Pa.—

Vertigo pentodon, and *Pupa corticaria*, Say.

Geo. W. Webster, Lake Helen, Fla.—

A very fine lot of Florida and Tennessee shells, including the new variety "albida" of *Bulimulus Dormani*; *Helix stenotrema*, *spinosa*, *auriculata*, *avara* and *Hubbardi*; *Goniobasis catenaria*, Say (a handsome variety); *Glandina truncata*, Gmel.; *Patula vortex*, Pfr. and *caeca*, Guppy; *Bythinella Monroeensis*, Dall and *Floridana*, Fr.; *Succinea luteola*, Gld. and *Salleana*, Pfr.; *Spirula Peronii*, Lam.; *Iphigenia Brazilianna*, Lam.; *Marginella apicina*, Menke; *Ianthina globosa*, Sw.; *Seila terebralis*, C. B. Ad.; *Echinella nodulosa*, Pfr.; *Unio Anthonyii*, *Blandingianus*, *aheneus*, *amygdalum*, *corvunculus*, and *Jewettii*, all of Lea.

John H. Campbell, Philadelphia, Pa.—

Haminea vesicula, Gould; *Cypraea Sowerbyi*; *Trivia Californica* and *Solandri* and *Mangilia merita*, Gld.

Geo. J. Streator, Garrettsville, O.—

Zonites ferreus, Morse; *Sphaerium rhomboideum* and *fabalis*; *Ancylus rivularis*, Say; and others.

Dr. G. D. Lind, St. Louis, Mo.—

Unio Higginssii, Lea and *Limnaea umbilicata*, C. B. Ad.

Jas. M. De Laney, Rochester, N. Y.—

One of the finest lots yet received, including *Cardium consors*, Sby.; *procerum*, Sby. and *muricatum*, Linn.; *Calliostoma canaliculatum*, Mart. and *annulatum*, Mart.; *Pecten aequisulcatus*, Cooper; *Helix devius*, Gld., *ptychophora*, A. D. Br., and *Stearnsiana*, Gabb; *Venus gnidia*, Br. & Sby.; *Strombus granulatus*, Wood; *Bulla nebulosa*, Gld.; *Tellina rubescens*, Ham. and *Gouldii*, Han.; *Tapes grata*, Say; *Modulus cerodes*, A. Ad.; and *Unio luteolus*, Lam., *iris*, Lea, and *undulatus*, Barnes.

Elwood Pleas, Dunreith, Ind.—

20 species of Claiborne fossils, including *Marginella larvata*, Conr. and *plicata*, Lea; *Conomitra fusoides*, Conr.; *Limopsis declivis*, Conr.; *Strepsidura bella*, Conr.; 3 species of *Solarium*; *Pasithea sulcata*, Lea; and *Corbula nasuta*, Conr.

S. Raymond Roberts, Glen Ridge, N. J.—

Helix Columbiana, Lea (collected by W. M. Gabb.)

H. A. Pilsbry, Philadelphia, Pa.—

35 species of Palaeozoic fossils from Bedford, Ind. All of them belong to the Warsaw Group. They include 4 species of *Straparollus*, 4 of *Pleurotomaria*; 3 of *Rhynchonella*; 4 of *Murchisonia*; 3 of *Bulimorpha*; *Productus Indianensis*, Hall; *Naticopsis Carleyana*, Hall; *Orthoceras epigrus*, Hall; *Nucula Shumardana*, Hall; and 2 species of *Terebratula*.

E. H. Fiske, Santa Cruz, Cal.—

5 species of Post-Pliocene fossils from Santa Cruz, viz.: *Purpura canaliculata* and *crispata*; *Nassa mendica*, Gld.; *Oliva biplicata*, Sby. and *Crepidula navicelloides*, Nutt.

W. J. Raymond, Oakland, Cal.—

10 species of California land and fresh-water shells, including the new *Sphaerium Raymondii*, J. G. Cooper, and *Planorbis subrenatus*, Carp., var. *disiectus*, J. G. Cooper, described in Proc. Cal. Acad. Science; *Physa Gabbii*, Tryon; *Helix arrosa*, Gld., *armigera*, Ancey and *Dupetithouarsii*, Desh. Some examples of the last named species introduced in 1884 into Oakland from San Simeon, San Luis Obispo Co., show a stunting of growth and slight deformity, which appear to be constant.

Elwood Pleas, Dunreith, Ind.—

6 species of Post-Pliocene shells found associated with bones of *Mastodon Americanus* at Losantville, Randolph Co., Ind. All of them are species yet living, viz.: *Planorbis bicarinatus*, *campanulatus* and *deflectus*, *Amnicola porata*, *Pisidium compressum* and *Limnaea humilis*.

Total to date— 199 genera, 573 species, 659 trays.

GENERAL NOTES.

POLYGYRA (MESODON) KIWAENSIS Simpson var. *ARKANSAENSIS* Pilsbry.—These shells differ from the types of *Kiwaensis* in being larger, more robust, the aperture larger, umbilicus smaller. There are also certain anatomical peculiarities which will be described in another place. The lip of these forms is much thickened within; it

is still a very doubtful question whether the species should be referred to *Mesodon* or *Triodopsis*. The form here described seems to establish a slight bond with such shells as *Mesodon thyroides*. The specimens were collected by Mr. F. A. Sampson near Hot Springs, Ark.—*H. A. Pilsbry*.

SNAIL EATERS.—Reading Mr. John Ford's experience with the voracious *Limax agrestis* (Nautilus No. 7, vol. IV) reminds me of another American "Cannibal."

While looking for *Glandina truncata* (in Florida) I had occasion to observe several of them chasing the *Helix Carpenteriana*, catching and devouring them, shell and all, and not only one or two of them, nay, five, six and more within a few minutes. In cleaning the specimens afterward I found nine specimens of *H. Carpenteriana* in the stomach of a single *Glandina*, some of the *Helix* yet alive.—*Dr. Fr. Stein, Indianapolis, Ind.*

EDWARD RICHARDS MAYO, AGED 82 YEARS.

Died, in Boston, Feb. 12th, of pneumonia.

Mr. Mayo was probably the oldest student of conchology in this country, being a few weeks older than his friend Dr. Wesley Newcomb. He was born in Roxbury, Mass., now a part of Boston. His occupation was book-keeping, and the last forty years of his life were spent with two firms—the great dry-goods house of A. & A. Lawrence & Co., and the law office of S. W. Dexter. When a young man he took up the study of shells, and his interest in them continued to the last. In the halcyon days of the American clipper ships and whalers, Mr. Mayo was among the first to systematically purchase the shells brought as curiosities.

He was personally acquainted with Drs. Gould, Lewis, Stimpson, Anthony and other well-known conchologists, who frequently had occasion to study the contents of his cabinet. He had also an extensive correspondence with collectors in many countries. His collection was particularly rich in foreign shells, of which he had several thousand beautiful specimens.

Mr. Mayo was a very modest man, unselfish, and to his younger fellow-students a useful friend, giving freely of his extensive information and of his specimens, and encouraging them in their pursuit of knowledge. To many readers of the NAUTILUS the news of his death will bring a feeling of personal loss.

EDWARD W. ROPER.

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MOLLUSKS OF THOMPSON'S LAKE, ILLINOIS.

BY W. S. STRODE, M. D., BERNADOTTE, ILL.

The beautiful *Anodonta suborbiculata* of Say has a sparse distribution and is rarely found in considerable numbers.

I know of but one locality in Illinois where it is to be found in abundance. This place is a still beautiful lake, five miles long by one in breadth, with an average depth of from five to eight feet; the bottom a mixture of black mud and sand; the shores and a hundred acres or so at each end covered with a growth of pond Lilies.

For a half century this lake has been a great fishing resort. With seines five hundred yards long, trammel and funnel nets, hook and line, spears, etc., immense quantities of fish are annually taken from its waters; great Buffalo, Cat-fish, Shovel-fish, Jack-salmon and a half dozen kinds of Sunfish, Bass, Pike and Pickerel.

State Geologist Worthen (deceased) seems to have been the only naturalist who discovered the conchological richness of the lake, and he kept the discovery to himself, collecting large quantities of the *Ano. suborbiculata* Say and *corpulenta* Cpr. and sending them to collectors and museums all over the world.

In the summer of 1890 I made a careful search for the Unionidæ and found it containing but four species: *Unio anodontoides* Lea, and *parvus* Bar., and *Ano. suborbiculata* Say, and *corpulenta* Cpr.

But the abundance of the two *Anodontas* make up for the lack of species. In some places the bottom of the lake seemed to be literally paved with the *suborbiculata*. With a six-tined potato-dig-

ger I would sometimes bring up five or six at a haul; and if the fishermen happened to be making a draw with the great seine, a half barrel of them would sometimes be drawn out at once,—many of them great beautiful adult shells nearly as large as a common dinner plate, the epidermis all intact, the stillness of the water and freedom from acid causing but little erosion. The younger shells in their beautiful iridescence, seem to have caught the tints reflected from the green woods, the blue sky and sparkling stars.

The other Anodonta, the corpulenta was not so plentiful in the deeper water that the suborbiculata seemed to prefer, but nearer the shores in shallow water, more or less shaded by the broad leaves of the water lily, many of them could be found. The umbones of this mussel, as found in this lake, more nearly approach perfection than in any other species.

Associated with this mollusk, among the water lilies, were great numbers of *Vivipara contectoides* Binney and *intertexta* Say and also more or less of the *Physa heterostropha* Say.

In collecting and handling these fragile shells much care must be taken as they break as easily as egg shells. When removed from the water I would pile them up in one end of the boat, and cover them up from the sun with a wet blanket. When transferred to my buggy (for I had to drive twenty miles to Bernadotte) I would first line the bottom of the bed with wet grass, on which I arranged the mussels and then again covered them up well with the wet blankets. On reaching home they were at once transferred to a large tub containing water. They must be cleaned without the use of hot water and immediately given a good bath of glycerine, and then kept in a cool place.

DESCRIPTION OF NEW SPECIES OF ANCTUS AND OLIVA.¹

BY JOHN FORD, PHILADELPHIA.

Anctus Pilsbryi Ford. Fig. 1.

See THE NAUTILUS iv, p. 81, 1890; Proc. Acad. N. S. Phila. 1891, p. 81.

Shell rimately umbilicated, the axis imperforate; ovate-conical, spire acute, apex black; whorls 7, slightly convex, the last some-

¹ Reprinted by permission, from Proc. Acad. Nat. Sci. Phila. 1891, pp. 97, 98.



Fig. 1.

what contracted near the base. Aperture extremely narrow, oblong; lip flatly reflected, the central half of its length provided with a flange extending towards the inner or columellar lip, from which proceeds a corresponding convexity, thus giving to the aperture a form much like the traditional key-hole. Color grayish-white, painted longitudinally with brownish and black lines.

Length of shell 23, diameter $9\frac{1}{2}$ mill. Width between flanges 1, width of flange on outer lip 2 mill. Color of lip white; aperture slightly shaded within. Habitat, Brazil.

Anctus anglostoma Wagner (*capneira* Spix), Fig. 2, and *A. Pilsbryi* are the only living species of the genus known, and both are in color pattern and general form very much alike. In the former species, however, the apex is not black and shining as in the latter nor are the apertures at all alike save in general outline. Indeed, that of *A. Pilsbryi* is absolutely distinct from any other known to the writer. This alone would justify its specific separation.



Fig. 2.

The figures were drawn from photographs of the shells and may therefore be accepted as correct.

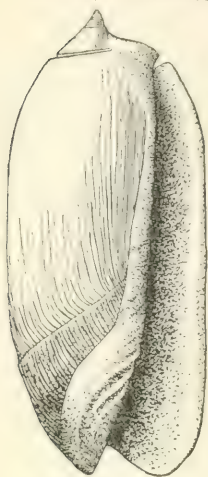
The species has been named in honor of my friend Mr. Henry A. Pilsbry, Conservator of the Conchological department of the Academy and present Editor of the "Manual of Conchology."

Oliva cryptospira Ford. Figs. 3, 4.

Shell cylindrical, slightly enlarged near either end, producing an obese appearance. Salmon-colored, with a few dashes of white accompanied by faint zigzag brownish lines showing through the enamel, the latter being somewhat thickened and more orange in color on the basal fasciole. Spire short, *with sutures entirely concealed by a heavy callus*. Edge of lip and interior of aperture white. Length of type specimen $2\frac{1}{4}$ inches. Greatest diameter 1 inch. Habitat, Moluccas.

This shell is probably well known to veteran collectors, since it has been posing for many years as a variety of *O. irisans* Lamarek, from which species, however, it is in fact distinct.

No figure was given with Lamarck's description of *O. irisans*, but a figure probably intended for the same shell appears in Reeve's "Conchologia Iconica," Vol. 6, Pl. 6, fig. 8a, where it is classed with typical *O. irisans* Lam. That this figure does not agree with Lamarck's description in any essential features is quite apparent.



Figs. 3.

is a question that cannot now be answered.

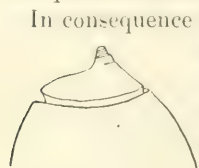


Fig. 4.

It seems, however, to have been accepted by my late friend, Mr. Tryon, as well as by Reeve, for a form of *O. irisans*, since it was copied for the "Manual" without remark; although several specimens exhibiting characters similar to those shown in the figure—but which belong to *O. cryptospira* only—were at the time in the Academy's collection. Whether these specimens were accidentally overlooked, or the distinctions noted deemed too trifling for special designation,

In consequence of this uncertainty, the responsibility of correcting the error of classing this form with *O. irisans*, (if error it be), is accepted rather reluctantly although in the firm belief that the change will benefit the student, as well as, in some slight degree, the cause of Science, also.

WESTERN PENNSYLVANIA SHELLS.

BY E. H. HARN, BLAIRSVILLE, PA.

The following is a list of species which I have collected in Western Pennsylvania. It may be of interest for the sake of locality :

Selenites concavus Say.
Zonites fuliginosus Griff.
Zonites laevigatus Pfr.
Zonites ligerus Say.
Zonites intertextus Binn.
Zonites inornatus Say.
Zonites nitidus Müll.
Zonites arboreus Say.

Pupa armifera Say.
Pupa contracta Say.
Ferussacia subcylindrica Linn.
Succinea obliqua Say.
Succinea avara Say.
Succinea Totteniana Lea.
Campeloma rufa Hald.
Planorbis bicarinata Say.

<i>Zonites indentatus</i> Say.	<i>Planorbis</i> (? var.) Harni Pils.
<i>Zonites milium</i> Morse.	<i>Carychium exiguum</i> Say.
<i>Zonites fulvus</i> Drap.	<i>Unio aesopus</i> Green.
<i>Zonites suppressus</i> Say.	<i>Unio alatus</i> Say.
<i>Zonites multidentatus</i> Binn.	<i>Unio circulus</i> Lea.
<i>Patula solitaria</i> Say.	<i>Unio clavus</i> Lam.
<i>Patula alternata</i> Say.	<i>Unio crassidens</i> Lam.
<i>Patula perspectiva</i> Say.	<i>Unio cylindricus</i> Say.
<i>Patula striatella</i> Anth.	<i>Unio gibbosus</i> Barnes.
<i>Patula lineata</i> Say.	<i>Unio fabalis</i> Lea.
<i>Helix labyrinthica</i> Say.	<i>Unio iris</i> Lea.
<i>Helix hirsuta</i> Say.	<i>Unio Kirtlandianus</i> Lea.
<i>Helix monodon</i> Rack.	<i>Unio ligamentinus</i> Lam.
var. <i>fraterna</i> Say.	<i>Unio multiradiatus</i> Lea.
<i>Helix palliata</i> Say.	<i>Unio mytiloides</i> Raf.
<i>Helix tridentata</i> Say.	<i>Unio obliquus</i> Lam.
<i>Helix albolabris</i> Say.	<i>Unio occidens</i> Lea.
<i>Helix Pennsylvanica</i> Say.	<i>Unio parvus</i> Barnes.
<i>Helix exoleta</i> Binn.	<i>Unio phaseolus</i> Hindr.
<i>Helix dentifera</i> Binn.	<i>Unio pustulosus</i> Lea.
<i>Helix thyroides</i> Say.	<i>Unio rectus</i> Lam.
<i>Helix profunda</i> Say.	<i>Unio securis</i> Lea.
<i>Helix pulchella</i> Müll.	<i>Unio subovatus</i> Lea.
<i>Helix pulchella</i> Müll.	<i>Unio subrotundus</i> Lea.
var. <i>costata</i> Müll.	<i>Anodonta undulata</i> Say.
<i>Helix nemoralis</i> Müll.	<i>Margaritana marginata</i> Say.
<i>Pupa fallax</i> Say.	<i>Margaritana rugosa</i> Barnes.
	<i>Margaritana undulata</i> Say.

EDIBLE MOLLUSKS OF RHODE ISLAND.

BY HORACE F. CARPENTER, PROVIDENCE, R. I.

I have read with much interest the article in the January NAUTILUS by Prof. Keep and its supplement by Henry W. Winkley in the February number and am tempted to add a short article on the edible mollusca of Rhode Island. I think in point of numbers of species, as well as individuals, Rhode Island will excel any state in the Union. As we have seen California has but five species and Maine only four regulars and two occasional, while Rhode Island can show eight every day and five irregular as below.

Mya arenaria Linn. Rhode Island is the metropolis of the clam both in production and consumption. The Rhode Island clam bake is a peculiar institution known all over the country. From June to September every day sees hundreds of bushels consumed at the various shore resorts, called here "down the river;" and there are several places in Providence where steamed clams are served in the shell every day in the year. The beds are inexhaustible and the more they are dug over, the faster they seem to propagate.

Ostræa Virginica Gmel. and *Ostræa borealis* Lam. are both very abundant and are consumed in great quantities. *O. Virginica* are brought here from the South in schooner loads and planted in the bay to grow, while *O. borealis*, the finest oyster in the world, is native to our shores.

Venus mercenaria Linn. is also very abundant and can be seen in our markets at all times.

Macra solidissima Chem. is abundant on the ocean shores and is used by the natives for making chowders.

Pecten irradians Lam. There are about two hundred boats engaged in scallop dredging and each boat is allowed by law to take only twenty-five bushels per day from September 1st to April 1st, making only five thousand bushels per day for seven months in the year. The adductor muscle only is eaten, while the rest of the animal (the "rim," so called) is thrown away. If cats are allowed to eat the rims their ears drop off. This fact is well known to all scallop dredgers and a good many careless cats can be seen at Pawtuxet and East Greenwich at any time, caused by eating scallop "rims" of which they are very fond.

Mytilus edulis Linn. is also a common article of food, both boiled and pickled.

Littorina littorea Linn. is very abundant and is relished by English people who had become accustomed to them in the old country.

Ensatella (or *Ensis*) *Americana* Gould is quite plenty and is eaten by the dwellers on the shore.

Buccinum undatum Linn. and *Pecten tenuicostatum* M. & A. are found only on the ocean shores and at Block Island and are eaten whenever they can be obtained, but they are not very plenty here.

Neverita duplicata Say and both the *Fulgur*, *carica* and *canaliculata* are occasionally thrown into a clam bake, and I have seen them eaten, but never indulged personally. I should think they would prove rather tough.

The fresh water clams, *Unio* and *Anodon* were formerly eaten by the Narragansett Indians, but I never knew of any white man hungry enough to try them.

ON PUPA RUPICOLA SAY, AND RELATED FORMS.

BY DR. V. STERKI, NEW PHILADELPHIA, OHIO.

This group of American Pupa is most interesting, but little known as yet. As in Europe the Pupa group *Torquilla* reaches its maximum development in numbers and forms in the countries around the Mediterranean, so in America the group of *Pupa rupicola* inhabits the West Indies and the mainland bordering the Gulf of Mexico, the Mediterranean of America. The American forms ranging under this group are much smaller than those of the Eastern continent—scarcely any exceeding 3 millimetres in altitude—and probably there are fewer species; yet scarcely less interesting are they, and well worthy of special study.

A very prominent feature of this and related groups is the apertural lamellae, of which I prefer saying more in another article specially on this subject. As the lamellar characters are nearly the same in the forms to be considered, and even some variations are found almost alike in all, we need not describe them specially in every species, as they are only of secondary value in differential diagnosis. It must be stated here, however, that a general characteristic is the particular development of the apertural lamella, which is long and more or less complex, and another the diversity of the inferior palatal being more or less distant from the margin, and of decidedly different direction and shape—in part of different morphological value.

In the following I intend communicating only a few systematic faunistic notices concerning those species inhabiting our country, not to give full descriptions and synonymy, leaving that for a “revision” of the North American Pupidae. Some of our forms have so universally been misunderstood that a rectification, as far as possible, will be justified.

Pupa rupicola Say.

It is characterized by its turriculate shape, with rather pointed apex, pale straw color, with thickened, white lip; aperture with

little marked sinuosity at the outer upper angle : lamellæ : apertural, more simple than in some other species ; inferior palatal placed and shaped as usual.

This well defined species has been found from South Carolina and Florida to Louisiana, always near the coast. I have not seen it from the West Indies.—Synonymy and references will be found with the following :

Pupa procera Gould.

When Dr. Gould published this species,¹ he knew it only from Baltimore specimens. Subsequently it was considered identical with *P. rupicola* Say. After having examined and compared many hundreds, even thousands of examples of both species, I came to the conclusion that they are quite distinct ; and I never saw a doubtful or intermediate specimen. The author's description leaves no doubt as to the identity of the species.

P. procera is characterized by its cylindrical, rather strong shell with obtuse apex, the uniformly brownish horn to chestnut color, and the form of the aperture ; one peculiar feature which has been pointed out by Gould,² is the deep seated and rather transverse inferior lamella in the palatal wall.

In Binney Terr. Moll. II, p. 339, under the head *P. rupicola*, the description is of *P. procera*, and so are the figures of the aperture ; the same is in W. G. B. Bulletin No. 28. In Gould (W. G. Binney edit.) Mass. Invertebr. 1870, under *P. rupicola* Say, the description is of *P. procera*, while the figure represents *rupicola*. There is no doubt but that Mr. W. G. Binney, as well as Pfeiffer and others, had not a sufficient number of good specimens before them, of one or either species, or they would have arrived at a different conclusion.

Our species is the only one of the subgenus living remote from the sea in the interior of the continent. It is distributed over a great part of our country. Its area is from New England and South Carolina to Minnesota and Texas, and in this whole region it is remarkably constant. Only some Iowa and Minnesota examples, from Winona, are somewhat smaller and more delicate, the apertural lamella showing a more marked configuration.

¹ Monograph of . . . Pupa, Boston Journ. III, p. 401, pl. 3, f. 12 ; IV, pl. 16, f. 12, and p. 355.

² l. c.

Pupa hordeacea Gabb.

There has also been much uncertainty about this form, since under its name no less than 3, and possibly more, different ones have been sent out by the author himself, and the descriptions published of it did not agree at all.¹ Yet it has been decided to let the name stand for a species related to *procera*, but having the shell larger (averaging alt. 3.0 diam., 1.3 millim.), the aperture of a different, somewhat rhombic shape; the crest behind the palatal margin is more or less white, corresponding to a rather strong callus; the palatal wall just behind the crest is considerably flattened, and the base rather compressed, keel-like.

P. hordeacea is decidedly variable; among the typical form there are numerous albino specimens; some show hardly a trace of a lamella on the palatal wall; from certain parts of its range, there are examples more conical and somewhat lighter colored, approaching *P. servilis* Gould. The species is found in Texas, New Mexico and Arizona. As already mentioned, it comes very near *P. procera* on one side, and shows much resemblance to *servilis* on the other, while it has a well characterized "strain" of its own. But with these interrelations, it is all the more interesting to the naturalist who desires something else than simply filing so and so many "well defined" species only.

Pupa hordeacella Pilsbry.

There is hardly a controversy about the synonymy of the species. It is characterized by its size, averaging the smallest of the group on the continent, the thin shell, its distinct striation, the flattened last half of the body whorl, the base being comparatively broader and more rounded than in its congeners and by the thin apertural margins. But it is also variable to a considerable degree; as to size, the smallest I have seen measuring 1.4, the largest 2.4 millim.; as to color, from pale horn to light chestnut; and pure albinos are quite common in some places. The smallest specimens generally have a remarkably lesser number of whorls comparatively.

Its area of distribution, as far as known, is from Florida through Mississippi and Texas to New Mexico and Arizona.

¹ Since the original description (Am. Journ. Conch. II, Oct., 1866, p. 331) was inaccessible to me, Mr. Dall had the very estimable kindness to forward me a copy of it and of the figure; from both it would be absolutely impossible to identify the species.—Conf. also W. G. Binney, Bulletin 28, p. 173.

Pupa servilis Gould.

A West Indian species, which has been reported from Louisiana and Texas; whether it is really living on the continent I am unable to decide. Among the many collections examined I never found it from our country.

I prefer the above name, since the description given with it corresponds exactly with the form taken for it, while that of *P. pellucida* Pfr. does not at all agree with the same, but quite well—as far as it goes—with some other forms from the West Indies.

Pupa ———.

For completeness I wish to give short notice here of a very interesting form, collected at our limits, at Hidalgo, Texas, by Mr. J. A. Singley. It resembles much the *P. servilis* of Gould, in size and appearance. But by careful examination a few features are found quite new and seen in none of the other continental forms of the group, viz., the presence of an infra-apertural lamella, between the “apertural” and the columella, and the inferior palatal lamella being very long and of particular shape. Both these characters I have seen also in some forms from Curacao, in the collection of Mr. W. G. Mazyck. Although this Pupa must be considered as specifically distinct, I prefer not naming it before, if possible, comparing other, probably related ones, from Central America and the West Indies.

A few words must be added concerning the geographical distribution of the species in question.

P. rupicola and *procera* I have seen together only in one instance, in a lot from “South Carolina,” where there was one example of the former among a number of the latter. But it was much to my satisfaction, a thing I had long looked for. It is evident that reports of *P. rupicola* Say, having been collected in the interior of the continent, say North and West of a line drawn from South Carolina to Louisiana, possibly also a part of southern Texas, are with all probability to be referred to *P. procera* Gould.

P. rupicola and *hordeacella* have been collected together in many places of Florida (by Messrs. Dall, Stearns, Hemphill, Webster, A. G. Hinkley, *et. al.*), and in Mississippi (Pass Christian, by Mr. Bryant Walker), while at and near Charleston, South Carolina, the former seems to be alone (Mr. W. G. Mazyck.)

In middle Texas (Lee Co., Mr. Singley) *P. hordeacella*, *hordeacea* and *procera* are found together; in lots from Comal County, (drift,

also collected by Mr. Singley) the same three were represented, but *procera* in small number. Among about 60 specimens from Hidalgo, Texas, (Mr. Singley, coll., sent by Mr. Wm. A. Marsh) there were *P. hordeacella*, *hordeacea* in a form somewhat differing from the type, and the species mentioned above; *P. procera* wanting.

From New Mexico I have seen *P. hordeacea* and *hordeacella*. Texas seems to be the center of distribution of the group under consideration on our continent, and there is no doubt but that more valuable things will be found in that state and the neighboring territories.

My own collection now contains about 65 numbers (75 vials) of the forms named above (except *P. servilis*) from the continent, and many more I have seen in other collections.

The title of this article may appear to be not fully appropriate, in so far as the species named there is the one, or one of the furthest removed from the common type of the whole group. Yet *P. rupicola* Say is the oldest and best known name, and, I think, the choice of it may be justified.

[CONTRIBUTED.]

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

SANTA BARBARA, CAL., FEB. 3, 1891.

To the President of the American Association of Conchologists :

DEAR SIR :

In response to your circular card of November 7, notwithstanding the probability that you may consider my response as coming too late, I venture to make a few remarks :

I regret to see the evident tendency among conchologists who are coming into print, to make radical and uncalled for changes in nomenclature.

I have noted more particularly those relating to our West Coast shells.

We, who have been for the past twenty-five or thirty years, accustomed to the names by which our mollusks have been known, fail to see the necessity or utility of making so many changes, especially by those not resident, nor especially interested in our local conchology, which renders our standard publications next to useless, places difficulties in the way of young students, puzzle and annoy our older naturalists, and have a tendency to fence in the field of

knowledge from many who would enter, if the way was not so beset with the thorns of synonyms and unnecessary divisions of genera.

If we were laboring along under huge and glaring inconsistencies, we would meekly submit to correction.

It would seem, that the only persons benefitted by this state of things are, those who make and support these changes in order to increase their catalogues of species and varieties * * * * by the addition of the so-called new varieties and the adoption of new names for old and well known species; or, those teachers of science who are in receipt of salaries and can thus afford to devote their whole time to one subject, or those who are anxious to air their knowledge by the use of hard names and the division of well known genera into as many sub-genera as possible.

The one great object of the teacher should be to make the road as easy as possible to his pupils and followers, whereas the real object of many would seem to be exactly the reverse, and instead of removing the stumbling blocks and smoothing the rough places, some of them seem intent upon making a hard road still more difficult.

For example—the name *Helix* is getting to be pretty well known as the scientific name for Snails, and in the index to “Land and Fresh Water Shells of North America” by Binney and Bland, published in 1869, we find 341 specific names including recognized species and synonyms, under the generic name of “*Helix*,” whereas in later publications we find this simple genus has been divided into thirty or forty sub-genera, the names of which convey no idea to the student, who is confronted by the substituted and, to him meaningless words, such as *Helminthoglypta*, *Micrarionta*, *Euparypha*, etc.¹ as applied to the poor innocent Snails, of which my esteemed friend Dr. Stearns says, “there is neither propriety nor advantage in their use.” I note also, that some of our writers * * * * * * * * while proposing to cut down the number of species and varieties of the Land Shells of other faunal regions, are hard at work manufacturing names for additional species and varieties in their own region, Yea verily, “Consistency thou art a jewel.” * * *

To illustrate what we may expect if this genus, species, and variety making continues, I will instance the way in which some of the small provinces and countries manufacture varieties of postage stamps for the express purpose of selling them to stamp collectors.

¹ The number of subgenera attributed to Mr. Binney is liberally estimated. Mr. B. never used the names *Helminthoglypta* or *Micrarionta*.—ED.

In some of these countries the amount realized from sales to collectors exceed the amount of revenue derived from their use for postal purposes, and when they desire to increase their revenue, they strike off a lot of "New Issues," or, by printing a different value on the "Old Issues," and placing an additional charge upon them meet with large sales. They even go so far as to deliberately make errors in these so-called "Surcharges" and thus create a demand for these manufactured "rarities," which seems to me to be a parallel case with some dealers and others interested in the Conchological Exchange.

LORENZO G. YATES.

GENERAL NOTES.

The Boston Society of Natural History has purchased from Mr. Gulick a valuable series of several hundred Hawaiian Achatinella. Those from the island of Oahu, are to be mounted on a large model of that island, made by J. H. Emerton. They will occupy their respective localities on the mountains and in the valleys, and will illustrate the progression and variation of species from the various centers. I have suggested to the Curator that a similar model be made to show the distribution of the *Patula strigosa* group taking Hemphill's fine series as a basis.—E. W. Roper, Revere, Mass.

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THE NAUTILUS.

VOL. V.

MAY, 1891.

No. 1.

DESCRIPTION OF TWO NEW SPECIES OF UNIO, FROM ARKANSAS.

BY WM. A. MARSH.

Unio Pilsbryi.

Shell quadrate, somewhat oblique, plicate, striate, slightly inflated before, compressed behind, very inequilateral, obtusely angular before, sub-biangular posteriorly, valves thick before, thin behind, beaks small and flat. Epidermis dark reddish-brown, without rays. Cardinal teeth compressed, oblique, grooved, double in both valves, lateral teeth long, slightly curved, solid, anterior cicatrices deep, pit-like, granular, posterior cicatrices not very distinct, confluent, nacre dull white.

Habitat. Little Red River, Arkansas.

Remarks. This species bears some resemblance to *U. perplicatus* Con., which is abundant in the same stream, but differs in being much flatter, beaks very much smaller, the growth lines much closer; it also differs in being coarsely striate over the entire surface of the shell; in its undulations it is very different, the plications being very small, and much broken up; in fact, semi-nodulous; from *U. undulatus* Barnes, which is also abundant in the same stream, it differs entirely in outlines, in the manner and disposition of its folds, color of epidermis, nacre, teeth, etc., etc.

I name this shell in honor of Mr. H. A. Pilsbry, Conservator Conchological Section, Academy of Natural Sciences, Phila., who first called my attention to its specific value. Specimens may be

seen in the United States Collection of the American Association of Conchologists, in the Academy of Natural Sciences of Philadelphia.

Unio Pleasii.

Shell smooth, oval, slightly elliptical, very inequilateral, valves rather thin, somewhat compressed, regularly rounded before, obtusely angular behind, beaks very small and flat, undulations very minute. Epidermis greenish-olive, usually covered with green capillary rays posteriorly, sometimes rayless. Cardinal teeth small, erect, crenulate, single in the right, and double in the left valve, sometimes tripartite in left valve; lateral teeth short and slightly curved, anterior cicatrices deeply impressed, posterior cicatrices very slightly impressed, confluent; nacre varying from pale rose to pale salmon, often silvery white and iridescent.

Habitat. Little Red River, Arkansas.

Remarks. In general form this shell bears some resemblance to *Unio spatulatus* Lea, but differs from that shell in being a much smaller and thinner shell, very much more compressed; its cardinal teeth are entirely different; it is not spatulate in form, and is very much more inequilateral; the nacre differs entirely; the very peculiar character of the females of this species must distinguish it from all others; they are deeply emarginate, very oblique, and sharp pointed posteriorly, bearing some resemblance to the females of *Unio conradianus* Lea.

I name this shell after my friend, Mr. Ellwood Pleas, of Indiana, who collected this species, with many other rare shells, in the interior of Arkansas. Typical specimens of both male and female are in the American Association Collection in Philadelphia.

EDIBLE MOLLUSKS, ETC., HERE AND THERE.

Mr. Carpenter's article in the last number of *THE NAUTILUS*, is fully as entertaining and profitable as his previous communications. It may be his last is a trifle more thrilling, and when this is supplemented by the usual spice of discrepancy, the picturesqueness is enhanced and the thoughtful reader is for awhile diverted from the plodding habit of careful definition and rational interpretation, and led unconsciously to soar far and wide on the reckless wings of fancy, and revel free and easy, in the salubrious atmosphere of fiction. The author's loyalty to Rhode Island is certainly commend-

able, and his belief that that illustrious commonwealth is the Banner State of the Union, in the matter of Oysters, Clams, Scallops and earless Cats, and such creature comforts, is heartily appreciated. I am prepared to wager—in vulgar parlance to bet—a bowl of “clam-chowder” against a “pan-roast,” with Mr. Carpenter or any other conchologist brother, that the mollusks referred to *are abundant and nowhere of better quality* than in Rhode Island, and whether I lose the bet or not, in the spirit of fraternal sympathy, to pay the bill; but here, let us “drop a stitch,” as the old ladies do sometimes in their knitting, and pick it up further on; let us leave the realms of romance and come down to the simple facts of *terra firma*.

If Mr. Carpenter will kindly turn to Mr. Keep’s article in the January NAUTILUS, he will perceive *two* facts. *First*, the title is “Mollusks of the San Francisco Markets.” *Not the Edible Mollusks of California*. *Second fact*; nowhere in Mr. Keep’s paper does the word California occur.

Yet Mr. Carpenter, in the last three lines of his article, on page 137 (of the April NAUTILUS), says: “As we have seen, California has but five species and Maine only four regulars and two occasional, while Rhode Island can show eight every day and five irregular as below.” The careful reader will look in vain to see any such statement in Mr. Keep’s paper, and the species enumerated named therein, are such as are *usually* on the stalls in the San Francisco markets.

In addition to those named by Mr. Keep I have occasionally seen, and have purchased, *Macoma nasuta*, *Saxidomus aratus*, *Acmæa patina*, *Platyodon cancellatus* and *Haliotis rufescens*. The big Cephalopod *Octopus punctatus* is frequently met with, especially in the Clay Street market, and is a common article of food among the Italians and Portuguese. Another cephalopod, a small ten footed species or squid, is frequently, if not usually, purchasable in the Chinese markets, and dried *Abalones* or *Haliotis* meats, are a regular article of food in Chinatown. I have supplemented Mr. Keep’s five species with others that pertain to the San Francisco markets, and do not propose to extend the list by going outside of the territory of that city, and up and down the *seven hundred* and more miles of the sea board of California, to name the *twenty-five or thirty* other species, that may fairly be regarded as “edible clams” and sufficiently abundant as to warrant their inclusion in a list of

species available for food supply, and therefore of commercial importance. Nor have I mentioned species that are "occasionally thrown into clam-bakes," or others that "were formerly eaten by the * * * Indians." A comparison in harmony with Mr. Keep's paper requires a list of those species of mollusks that are ordinarily on sale in the markets of Providence and Newport, and this is what Mr. Carpenter should have given.

The space occupied by this criticism, etc., is perhaps out of proportion to the importance of the matter criticised; so I will only take up the stitch previously dropped and in closing express my surprise and astonishment at the effect of Rhode Island "scallop-rims," on Pawtuxet and East Greenwich cats, tabbies or tommies, not specified, and marvel greatly over the possibility of turning mules into horses by the same kind of fodder.

Another and more serious matter is hinted at, for the mollusks of California, Maine and Rhode Island are referred to as "regulars" and "irregulars." This has the flavor of war. I have never seen any military clams on the West Coast. I presume the "regulars" belong to the standing army, and the "irregulars," are to be regarded as militia only.

R. E. C. S.

April 7th, 1891.

ON THE GENUS *TEBENNOPHORUS* BINNEY, OR *PHILOMYCUS*, RAF.

BY H. A. PILSBRY.

A recent discussion of this genus in the pages of the valuable English magazine, *Annals and Magazine of Natural History*, is probably of sufficient interest to American conchologists to justify us in reprinting the several articles.

Article I. (*Ann. Mag. N. H.*; Nov., 1890.)

Notes on Slugs chiefly in the Collection at the British Museum. By T. D. A. COCKERELL.

THE GENUS *Limacella*, BLAINVILLE.

While working on the slugs at the British Museum I came across the type specimens of *Limacella lactiformis*, Blainville. The two examples are in a bottle with the label "*Limacella lactescens*," and another label, apparently written by Dr. Heynemann, "Original zu Fig. 1, Taf. 7. Fér. Hist. Nat." They are true

Philomycus, presenting no generic difference from the well-known species of that genus. Heynemann (1884) has referred them to *Arion*, but he could not have examined them sufficiently, and was no doubt misled by the figure in Man. de Mal. (1827), pl. xli. That they are really Blainville's types need not be doubted, as they agree with his figures in outline, and his original description, notwithstanding that he misunderstood the characters of the slug, is sufficient to show that he had not an *Arion* before him. He refers to the absence of a shell and the genital orifice at the base of the right tentacle. The outline of the figure, and especially the anterior portion of the mantle, suggests at once a *Philomycus*. The supposed *Arion*-like mantle indicated in the figures is really due to an outline of some of the internal organs, visible on account of the transparency of the slug. The figures in Journ. de Phys., November, 1817, show how the mistake began, fig. 4 having even a sort of spiral coil in the middle of the anterior part of the mantle. The figure of *L. elfortiana* in Man. Mal. is the same outline, but apparently patched up from an *Arion ater*, with altogether fictitious rugæ on the back. Férussac's figure is after one of those in Journ. de Phys., and is fairly recognizable.

Altogether I think it must be held that Blainville described and figured his genus *Limacella* sufficiently for recognition, and as it antedates *Philomycus* by three years, the name must be used. *Limacella*, Brard, 1815, need not be considered, as it is identical with *Limax*, Linné, 1767. The synonymy of *Limacella*, Bl., will accordingly stand:—

LIMACELLA, Blainville.

1817. *Limacella*, Blainville, "Mém. sur quelq. Moll. Pulm." Journ. de Phys. Dec. 1817, p. 443 (text), and Nov. 1817, figs. 4, 5.

1820. *Philomycus*, Rafinesque, Ann. of Nat. p. 10.

1820. *Eumelus*, Rafinesque, Ann. of Nat. p. 10.

1824. *Meghimatium*, v. Hass. Bull. Univ. Sci. iii. p. 82.

1842. *Incilaria*, Bens. Ann. & Mag. Nat. Hist. ix. p. 486.

1842. *Tebennophorus*, Binney, Bost. Journ. Nat. Hist. iv. p. 171.

1864. *Pallifera*, Morse, Journ. Portl. Soc. i. 8, fig. 5, pl. iii. fig. 6.

It does not seem necessary to recognize more than one genus here, though v. Ihering (Nachr. d. m. Ges. 1889) recognizes three—*Philomycus*, *Pallifera*, and *Meghimatium*. *Pallifera* may be conveniently retained as a subgenus.

The species of *Limacella* are as follows:—

Limacella lactiformis, Blainv.

1817. *Limacella lactiformis*, Blainv. Journ. de Phys. Dec. p. 444.

1821. *Limacellus lactescens*, Férussac, Hist. Nat. Moll. pl. vii. fig. 1.

1825. *Limacella elfortiana*, Blainv. Man. de Mal. et de Conch. p. 464.

This appears to be distinct from any species since recognized. The British Museum types may be briefly described as follows:—42 millim. long; respiratory orifice 7 millim. from anterior border of mantle. Sole, lat. 7 millim. Entirely greyish-white; mantle pellucid, semitransparent, finely granulose. Sole slightly ochreous, unicolorous. A distinct groove round the edge of the foot. Liver pale chocolate.

Gray in 1855 (Cat. Pulm. p. 158) has referred this species to *Philomycus*.

Limacella carolinensis (Bosc).

Limax carolinensis, Fér. Hist. 77, pl. vi. fig. 3.

There are two specimens of this species in the British Museum from Virginia (*Dr. J. Wyman*), agreeing excellently with Férussac's figure. This slug is cylindrical, curved, and *narrow* (in alcohol); *sole narrow*; ground-colour and colour of sole pale yellow, back thickly marbled with brown-grey, and with *two longitudinal series* of dark egg-shaped spots. Jaw bright-coloured, not ribbed. (Description from Brit. Mus. specimens.)

Dr. Gray (Brit. Mus. Cat.) also describes *L. carolinensis*.

Limacella nebulosa.

? *Eumelus nebulosus*, Raf. Ann. of Nat. 1820.

Tebennophorus carolinensis, Binney, Terr. Moll. U. S. vol. ii. p. 20.

This and the last have hitherto been included together under the one name *carolinensis*, and it is not without misgivings that I venture to separate them here.* Yet, from the specimens which I have examined, there would certainly seem to be a specific distinction between the northern and southern forms referred to *carolinensis* in the Eastern United States and Canada. The British Museum contains specimens of *nebulosa* as follows:—

- (1) From Mr. W. G. Binney, labelled *T. carolinensis*.—Ochreous, marbled with black above, the marblings rather inclined to be in three longitudinal series. Sole unicolorous.
- (2) W. Canada (*Dr. MacLagan*).—Pale yellow, marbled above with brownish-grey, the markings being a broadish dorsal and narrower lateral brownish-grey bands, with irregular spots over the rest, except sides near foot. Sole unicolorous.
- (3) Amhurstburgh, Canada West (*Dr. O. W. MacLagan*).—Like the last, but mottling grey and more diffuse; two narrow dorsal and narrowish lateral bands, rather obscurely indicated in grey. Grey mottling thicker. Ground-colour pale yellowish.

Comparing *carolinensis* with *nebulosa*, we note:—

- (a) The Virginia *carolinensis*.—Sole narrow, yellowish, pale, without transverse striæ; body smoothish.
- (b) *nebulosa*, no. 1 above.—Sole broad, brown, with strong transverse striæ; body rugose.

Or, taking measurements:—

- (a) The Virginia *carolinensis*.—Long. 35 millim., sole, lat. 3 millim.
- (b) *nebulosa*, no. 1 above.—Long. 35 millim., sole, lat. $7\frac{1}{3}$ millim.
- (c) *nebulosa*, no. 2 above.—Long. 36 millim., sole, lat. 8 millim.

Rafinesque described five supposed species belonging to *Philomycus* and *Eumelus* in 1820 as *quadrilus*, *oxurus*, *flexuolaris*, *fuscus*, and *lividus*. They

* Mr. W. Binney writes (*in litt.* Sept. 9, 1890):—"I am rather sceptical about there being two species . . . as you say . . . —there is a big species of *Tebennophorus* confounded with *carolinensis*, but having a ribbed jaw."

will probably prove to be varieties of *nebulosa* or *carolinensis*, but they have not yet been identified.

* * * * *

Limacella dorsalis (Binney).

Philomycus dorsalis, Binney, Bost. Journ. Nat. Hist. 1842, iv. 174.

Pallifera dorsalis, Morse, Journ. Portl. Soc. 1864.

N. E. United States. Jaw ribbed.

Limacella Wetherbyi (W. G. Binney).

Pallifera Wetherbyi, W. G. Binney, Ann. Lyc. of Nat. Hist. of New York, 1874, xi. 31, pl. ii. figs. 1, 2.

Kentucky. Jaw ribbed.

Limacella Hemphilli (W. G. Binney).

Tebennophorus Hemphilli, W. G. Binney, Man. Amer. Land-Shells, 1885, p. 247; Third Suppl. Terr. Moll. U. S. 1890, pl. vi. fig. H.

Georgia and North Carolina. Jaw ribbed.

Article II. (*Ann. and Mag. N. H.*, Feb., 1891.)

Critical Notes on the Genus Tebennophorus and the recent literature relating to it. By HENRY A. PILSBRY, Conservator of the Conchological Section, Academy of Natural Sciences of Philadelphia.

The slugs of this genus have been commented upon lately by a number of English and continental authors, who have arrived at very different results, it has occurred to the writer that a presentation of the subject by one who has studied the species in their native forests would not be without interest.

Firstly, regarding the proper name for the genus. We will consider the several designations in the order of their publication.

In 1817 Blainville proposed a genus *Limacella* with the following characters:

"Body limaciform, entirely naked, provided with a foot as wide as itself, but separated by a groove.

"Orifices of the organs of generation widely separated and communicating between each other by a furrow which occupies the entire right margin of the body."

Blainville refers to his plate ii. fig. v, illustrating the type species, *L. lactiformis*.

A moment's reflection will convince any competent malacologist that the above description does not indicate *Tebennophorus*, a slug in which the genital organs have a common outlet. It cannot be supposed that Blainville has made a mistake in observation, because in the same paper he describes at length the external anatomy of *Veronicella*, and correctly locates the orifices. The figure given is equally non-committal; so much so that Mr. Cockerell (who supposes *Limacella* to equal *Tebennophorus*) really cites "figures 4, 5" instead of 5 only*—his inability to tell Blainville's figure of *Limacella* (fig. 5) from that of *Veronicella* (fig. 4)

* That this is not mere inadvertence on Mr. Cockerell's part is demonstrated by his remarks on Blainville's fig. 4 on p. 380 of the 'Annals' for November, 1890.

being evidence enough that the former is not generically recognizable. As to the fact that Mr. Cockerell has found a couple of slugs under the name "*Limacella lactescens*" in the British Museum, which he *supposes* are the types of *L. lactiformis*, it is absolutely irrelevant to the subject. What evidence is there beyond the merest guess work that they are Blainville's types? And even if they were (a most improbable hypothesis!), their mere existence does not constitute *publication*. We have nothing whereby to judge *Limacella* save the original figures and description, and these certainly indicate a type of slug different from *Tebennophorus*.

It may also be noted that the name *Limacella* is preoccupied, having been used by Brard in 1815. If we care to be really consistent we must use *Limacella* in place of *Agriolimax*!

The second name for the genus is *Philomycus*, Rafinesque. This genus, says its author, "differs from *Limax* by no visible mantle, the longer pair of tentacula terminal and club-shaped, the shorter tentacula lateral and oblong." Rafinesque describes four species and says there are many more in the United States. Not one of those he described has been identified with any certainty, and only *two* species of *Tebennophorus* occur in the regions visited by him. Rafinesque also describes the genus *Eumeles*—"differs from *Limax* by no visible mantle, the four tentacula almost in one row in front and cylindrical, nearly equal, the smallest pair between the larger ones." Of this genus he describes two species, one of which, *E. nebulosus*, has been recognized by Mr. Cockerell, whose penetration and facilities have enabled him to identify new or old species which have escaped the observation of specialists on the American fauna.

We will not comment on these Rafinesquian genera; those who find slugs corresponding to them should of course use the names. *Eumeles* is especially remarkable, and we would invite the attention of conchologists who hunt slugs (in old collections of museums and elsewhere) to the unusual arrangement of the tentacles in this genus, and to the fact that a number of Rafinesque's species are still at large.

The genus *Meghimatium*, v. Hasselt, 1824, was founded on a species of this genus from Java, and was quite recognizably described. The names *Tebennophorus*, Binn., and *Incilaria*, Benson, were both proposed in 1842, the probable priority being in favour of the first.

Morse in 1864 established the genus *Pallifera* for a species with ribbed jaw.

This review shows that several names for the genus, more or less certainly applying to it, were proposed anterior to 1842, the date of *Tebennophorus*. Of these names *Philomycus* and *Meghimatium* are the only ones available, *Eumeles* and *Limacella* being clearly inapplicable. Since continental authors generally have adopted the name *Philomycus*, it seems advisable to retain that designation for the genus if *Tebennophorus* must be rejected.

(To be continued.)

PRELIMINARY NOTICES OF NEW MEXICAN SHELLS.

BY H. A. PILSBRY.

The shells here described were collected by the expedition from the Academy of Natural Sciences of Philadelphia, and will be fully described and illustrated in the Proceedings of the Academy.

Orizosoma, new subgenus of **Streptostyla**.

Shell *perforated*, the columella thickened, *simply concave*, almost imperceptibly sinuous above.

Streptostyla (Orizosoma) tabiensis, n. sp.

Shell ovate-turreted, rather thin, smooth, the base deeply indented and minutely umbilicated; whorls 6, the three earlier distorted; aperture narrow, $\frac{1}{2}$ the length of the shell, outer lip sinuous; columella thickened, concave. Alt. 9.8, diam. 4.8 mill.

Cave at Tabi, Yucatan.

Carychium exiguum mexicanum, n. var.

Shell cylindrical; whorls $4\frac{1}{2}$; aperture equalling or a trifle exceeding $\frac{1}{3}$ of the total length. *Outer lip thickened at and below the middle by a very heavy deposit of callus upon its face*; columellar fold subobsolete. Surface delicately striated. Alt. 1.8, diam. .8 mill.

Orizaba, Mexico.

Physa osculans var. **Patzcuarensis**, n. var.

Shell thin, obconic, broad above, narrow below; spire small, acute, whorls 4, rapidly enlarging; columella long, vertical, slightly sinuous; color light brown or whitish. No internal lip-rib; surface smooth. Alt. 15, diam. 11 mill.

Lake Patzcuaro, Mexico.

Holds the same relation to *Ph. osculans* Hald. that *ancillaria* + *Parkeri* hold toward *Ph. heterostropha*. The rationale of these bulging, broad-topped forms of *Physa* is discussed in my paper in Proc. A. N. S. Phila.

Potamopyrgus ? Bakeri, n. sp.

Shell slender, elongated, composed of $5\frac{1}{2}$ very convex whorls; aperture ovate, its length contained more than three times in the length of the shell. Surface marked by delicate growth-lines, having low, inconspicuous longitudinal folds, sometimes quite regular and well marked on the upper whorls, and encircled by numerous fine, subobsolete spiral striæ. Alt. 4, diam. 1.9 mill.

Yautepec, Mexico.

Has much the general aspect of *Tryonia protea* Gld. It is named in honor of Mr. FRANK C. BAKER who collected the specimens.

Pyrgulopsis ? Patzcuarensis, n. sp.

In general form like *P. nevadensis* Stearns. Whorls acutely keeled in the middle, convex above the keel, the last whorl obtusely

shouldered above the median keel. Covered with an olive epidermis. Surface marked by delicate growth-lines and excessively fine, close spiral striæ. Alt. 5.2, diam. 3 mill; alt. of apert., 2, width 1.3 mill.

Lake Patzeuaro, West Mexico.

This species is very different from other American Amnicoloids.
(*To be continued.*)

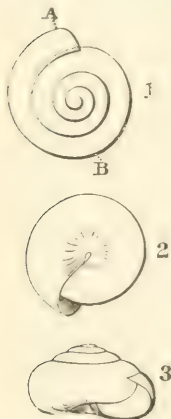
DESCRIPTION OF A NEW SPECIES OF HYALINA.

BY WM. H. DALL.¹

Dr. V. Sterki, of New Philadelphia, Ohio, has of late years been giving special attention to the minute forms of Pulmonata, *Vertigo*, *Pupilla*, *Hyalina*, etc. In 1886 he collected a small *Zonites*, of the section *Hyalina* or *Conulus*, which, being submitted to several naturalists, appeared to be a new species, although of remarkably small size. In 1887 a few more specimens were obtained, which he has submitted to me with the request that I describe them.

Shell minute, thin, yellowish translucent, brilliant, lines of growth hardly noticeable, spire depressed, four-whorled; whorls rounded, base flattened, somewhat excavated about the center, which is imperforate; aperture wide, hardly oblique, not very high, semilunate, sharp edged, the upper part of the columella slightly reflected; upper surface of the whorls roundish, though the spire as a whole is depressed. Max. diameter 0.044 inch (line A—B, Fig. 1); alt. 0.026 inch.

This little shell is clearly not the young of a *Pupilla* or of any of our other small *Zonites*. It is certainly the smallest American species. *H. parvula* Rang, from Cape Verde Islands, has a little less diameter, but is higher in the spire. *H. pygmaea* and *H. minutissima* Lea are decidedly larger, besides belonging to a different group. It is probably one of the smallest species known, and remarkable for its imperforate umbilicus.



¹ From Proceedings U. S. National Museum, vol. xi, 1888, p. 214.

It was collected on a grassy slope, inclining to the northward, and covered with grass, moss, and small bushes, and so far has not been found anywhere else. Its permanent place in the system will, of course, be determined by an examination of the soft parts, which remains to be made.

GENERAL NOTES.

Owing to continued illness in his family, Mr. CAMPBELL, President of the American Association of Conchologists, has been unable to contribute the monthly reports on Association affairs. He hopes to resume them in the June issue.

Mr. C. W. JOHNSON, Junior Editor of the NAUTILUS, and Mr. WM. FOX, of the Academy of Natural Sciences, have spent the month of April in that paradise of land snails, Jamaica. They will return about the middle of May, and doubtless bring with them hosts of shells and insects.

The personal interest felt by younger students in their predecessors in science, is our excuse for clipping the following from a recent letter :

"In the March number of the NAUTILUS, Mr. Roper said that Mr. Mayo was probably the oldest student of conchology in America. Mrs. MARY B. ALLEN KING, of Rochester, N. Y., is 92 years old, having been born in January, 1799. She has studied and collected shells before Mr. Mayo (whom she met at one time) did; and has corresponded with most of the U. S. Conchologists. She was elected a member of the American Association for the Advancement of Science in 1886, at the Buffalo meeting."—A. M. K.

AUSTRALIAN SLUGS.—Mr. Charles Hedley exhibited and offered some remarks on specimens of *Vaginula leydigi*, Simr., and *V. hedleyi*, Simr., two interesting slugs from Brisbane, recently added to the molluscan fauna of Australia (*vide* Zoologischer Anzeiger, 1889, p. 551; and Abstr. in Journ. Roy. Micros. Soc., 1890, p. 21). These slugs are very abundant in the Brisbane botanical gardens, occurring also in lawns and gardens in that part of the city which was formerly scrub land. After a shower they may be collected in abundance, crawling rapidly over the asphalt paths and the grass. *V. leydigi* is much commoner than *V. hedleyi*, which it resembles in shape, size and habits, but from which its coloration distinguishes it in all stages of its growth, the former being a blackish-brown with

a tawny yellow dorsal stripe, the latter a dark form without any stripe. These molluscs are the first real representatives of their genus found in Australia, the only *Vaginula* previously known here, *V. australis*, Heyneman, belonging to that trigonal group which embraces *V. prismatica*, Tapparone-Canefri, from Dutch New Guinea, *V. tourannensis*, Souleyet, from Cochin-China, and *V. trigona*, Semper, from the Philippines, constituting a natural but as yet unnamed genus. He also took the opportunity of pointing out that he had submitted specimens of *Limax queenslandicus*, Hedley (P. R. S. Q., Vol. V, p. 150, pl. 5), to Dr. Simroth, who had determined them to be *Agriolimax laevis*, Müller. This species is probably the slug (Journ. des Mus. Godeff., XII, p. 159) mentioned under the name of *L. rarotonganus*, Heyn., as occurring in Australia. Few if any land molluscs range so widely, since, under different names by various authors, this form has been recorded from Europe, North and South America, the West Indies, Madagascar, and many islands of the Pacific.—*From advance proof sheet Proc. Linn. Soc. N. S. Wales, Australia, Dec., 1890.*

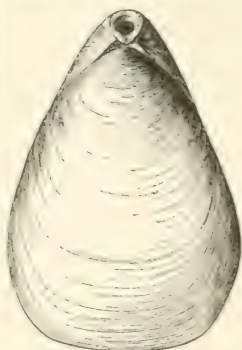
DR. JOSEPH LEIDY.

Professor JOSEPH LEIDY, M. D., LL. D., the eminent scientist, died at his home in Philadelphia on April 30th, 1891. Dr. Leidy was born in Philadelphia, Sept. 9, 1823. His ancestors on both sides were Germans, from the valley of the Rhine. His taste for natural history was exhibited at a very early age, and when a mere boy he collected and studied minerals and plants. His father proposed for him the career of an artist, but so absorbed was the boy in anatomical and natural history studies that, with the encouragement of his mother, at the age of seventeen he began the study of medicine, graduating in 1844. In 1845 he was appointed Prosector to the Chair of Anatomy in the University of Pennsylvania. Dr. Leidy's first scientific work was a paper on the anatomy of *Litorina*, published by the Boston Society of Natural History. In 1844 he began, at the instance of Dr. Amos Binney, to study the anatomy of land snails. The result is seen in his beautiful anatomical drawings in the first volume of Binney's "Terrestrial Mollusks," and in the chapter on special anatomy written by him. In 1845 Dr. Leidy was elected a member of the Academy of Natural Sciences of Philadelphia. He has been closely connected with this institution

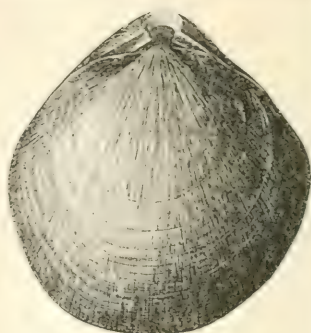
in various official positions ever since, and has been its President since 1880. Dr. Leidy published very extensive memoirs on vertebrate paleontology, on Rhizopods (a truly magnificent quarto volume), on the anatomy of Insects, and especially on Entozoa and Vermes generally. Indeed, nearly every branch of zoological literature has received valuable additions at his hands. His work is so many-sided that in the broadest sense of the word, Dr. Leidy may be called a Zoologist. He was an honored member of many scientific societies in both hemispheres, and had received substantial tokens of the value of his work from the Boston Society (Walker Prize, \$1000), the Geological Society of London (Lyell Medal), and other learned bodies.

In his private relations Dr. Leidy was of a most kind and helpful disposition. He had an almost morbid dislike of contention of any kind. The loss to American zoology is irreparable.

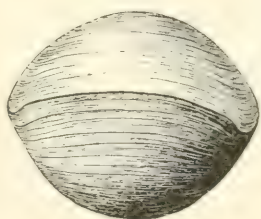




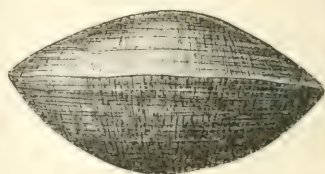
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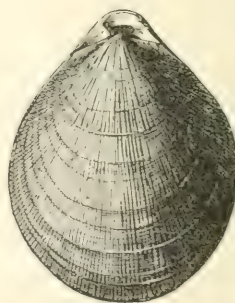
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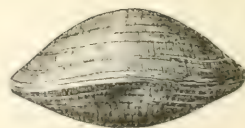
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THE NAUTILUS.

VOL. V.

JUNE, 1891.

No. 2.

ON THE MEANS OF DISTRIBUTION OF UNIONIDÆ IN THE SOUTHEASTERN UNITED STATES.

BY CHAS. T. SIMPSON, WASHINGTON, D. C.

In the March number of the NAUTILUS Mr. S. Hart Wright in some notes on the distribution of *Unionidæ* in the Southeastern United States thinks it remarkable that many of the species of Georgia and the Carolinas should be found in Southern Florida, and that they should pass from one stream to the other. I think when we fully consider all the conditions of environment of these mollusks it will be easy to understand how they have migrated.

The region is one of excessive rainfall. Over a wide area of territory bordering on the Gulf and the Atlantic it is nowhere less than 45 inches a year, ranging up to 75 inches in the vicinity of Cape Hatteras. North of latitude 30° the most of this moisture falls during the winter and early spring. South of somewhere near that line the regular dry and rainy seasons of the tropics set in, and nearly all the precipitation occurs in June, July and August. Of course these conditions vary somewhat with different seasons and under different circumstances, but as a rule in any part of this area the greater amount of the annual rainfall occurs within a limited period, producing extensive floods.

It is well known that all the region indicated, or at least a wide belt of it extending along the Atlantic and Gulf coasts, is exceedingly low and flat, consisting for the most part of level, sandy plains, rising as a rule but a few feet above, and alternating with swampy streams.

Having thus outlined the physical conditions of their environment, it may perhaps be well to speak of the manner in which the Unionidæ migrate from one locality to another.

The number of young produced by the species of this family is simply enormous. Lea counted some 600,000 perfectly formed embryos in the ovaries of an *Anodonta undulata*, and estimated that a female *Unio multiplicatus* contained no less than 3,000,000 shells.

It is believed that these young bivalves sometimes attach themselves to fishes and are thus carried from place to place; no doubt others are taken up in mud on the feet or feathers of aquatic birds, and may survive a short transit through the air, and certainly they might be swept from stream to stream across the country during the time of floods, when almost the entire surface of that level area is covered with water, in many places flowing with a rapid current. During the rainy seasons in South Florida I have repeatedly seen the whole country a sheet of water, with myriads of fish swimming in every direction among the palmettoes and over the fields. That the *Unionidæ* are carried out over the land is, I think, proved by the fact that I have found *Unio obesus* existing in great numbers in low places and drains in the piney woods of South Florida, at quite a distance from any stream, where there was not a drop of water outside of perhaps three months of the rainy season, and where during the remaining nine months of the year they must have lain dormant in slightly damp sand. I have dug these unios alive out of such sand banks in such places, and during the dry season, by the bushel.

It is a well-known fact and one which seems to me much more strange than the migration of unios across such a country, that artificial ponds and reservoirs often become densely peopled with the Naiades, even when their outlets are altogether too insignificant in size to be a residence for these molluscs. In such cases it would seem most probable that aquatic birds had been the means of such distribution, and possibly in rare instances they may have been lifted from their original homes and carried by cyclones.

But once having reached the lower part of the St. Johns River, I cannot conceive of any difficulty mollusks would encounter in spreading toward its sources. The stream is really little more than a freshwater estuary for a long distance from its mouth, and has but a few feet of fall throughout its entire length. Let any of the *Unionidæ* be placed in any part of a stream and if the conditions

are favorable they will migrate against the current as well as with it. Any one who has ever collected these mollusks at all extensively will notice their furrows on sandy or muddy bottom, often extending for forty or fifty feet, and made apparently without any regard to the direction of the stream. I am led from my observations to believe that most of the unios if placed in favorable conditions would migrate over considerable stretches of water in a comparatively short period.

PALUDOMUS PALAWANICUS, n. sp.

BY DR. AUG. BROT, GENEVA, SWITZERLAND.

T. imperforata, globoso-turbinata, solidula, fusco-olivacea nonnunquam obscure flammulata. Spira breviter exserta, subintegra, sed superficialiter erosa; anfract. $4\frac{1}{2}$ –5, rapide crescentes, valde convexi, vix infra suturam submarginatam paulo planulati, sub lente tenuissime spiraliter striati et striis incrementi subgranosa decussati, striis infra suturam et ad basin posterioribus, filiformibus. Anfractus ultimus magnus, basi striis elevatis filiformibus nonnulli distantibus, ornatus. Apertura ampla, late ovata, intus fusco-brunnea, margine dextro subserrato, vix incrassato, intus albo limbato; columella incrassata, alba, callo parietali albo crasso.

Operculum?

Alt. 19 mm., lat. 17 mm.; apert. alt. 13 mm., lat. 10 mm.

Habit. I. Palawan, Philippines (legit E. L. Moseley).

Shell globose with a short exserted spire, moderately thick, dusky-olivaceous, sometimes with irregular translucent interrupted flames. Spire short, almost entire, but superficially eroded. Volutions $4\frac{1}{2}$ –5, very convex, slightly flattened under the suture, which is finely margined, covered with fine spiral unequal striae, and decussated by the lines of growth; last whorl globose, with some distant filiform striae at the base and along the suture. Aperture wide, ovoid, inside dusky-brown, sometimes with one or two narrow pale bands; columella thickened, white; outer lip obscurely serrated, slightly thickened inside, white at the margin.

This interesting new shell, although the operculum is unknown, belongs certainly to the genus *Paludomus* and is, I believe, the first species of the genus mentioned from the Philippines. It cannot be

confounded with any other; it might be compared only to *Paludomus lacunoides* Aldrich, from Borneo, but that species is larger, heavier, has a more elevated spire, less tumid volutions, and is entirely smooth, not to speak of the characteristic peculiar structure of its umbilical area.

The *Paludomus Palawanica* was collected by Mr. E. L. Moseley in a brook about ten miles from Puerto Princesa in the Island of Palawan, Philippine Archipelago.

**TEREBRATULINA UNGUICULA CPR. VAR. KIIENSIS, DALL
AND PILSBRY.**

? *T. unguicula* Cpr. P. Z. S. 1865, p. 201, figs. 1-4.

? *T. caput serpentis*, var. *unguiculata* Dav. Trans. Lin. Soc. iv, p. 25, 1886.

Terebratulina sp. Dav. Challenger Brach. p. 36, pl. 1, fig. 10, 1880.

Habitat: Phillippines, in 82 fathoms N. E. from Mindanao, Chall. Exp.; Coast of Province Kii, Japan, Stearns; N. W. coast of America, various authorities including Carpenter, Dall, Whiteaves, etc.

Among the shells collected by Mr. Stearns in Japan, and sent to Mr. Pilsbry for identification, is a coarsely radiately striated *Terebratulina* which has been carefully studied, but in the absence of more material, cannot be finally pronounced upon. It appears to be the adult of a form of which a young specimen was submitted by Dr. Davidson in 1879 to Mr. Dall for examination and which had been collected by the Challenger Expedition. It was not named at that time in view of the fact that it was obviously young, and the number of nominal East Asian *Terebratulinas* obviously too great for the known species.

This shell is sculptured like *T. unguicula* Cpr. and the larger the specimen, the more *unguicula* seems to resemble the Japanese form. *T. unguicula* under the name of *caput-serpentis* has been recognized already in Japan, by Davidson.

The present form differs from the largest *unguicula* with which we have been able to compare it in the following particulars. It is larger and proportionately somewhat wider and the beak proportionately shorter, much such differences as would come about by increased size in such a species as *unguicula*. If more material should prove that the supposed variety cannot be connected with *unguicula*, the varietal name can be taken as specific. The specimen

noted measures 44 mm. in total length; 38.5 mm. in the length of the hæmal valve; 40 mm. in maximum width and 21.5 mm. in maximum diameter. It is waxen white with extraneous brown stains and has no anterior flexure. Davidson's figure of *Tr. Crossi* ('Trans. Lin. Soc. IV, pl. 3, fig. 6) resembles it, but is more faintly sculptured and less transverse.—*W. H. D. and H. A. P.*

EXPLANATION OF PLATE I.

Figs. 1, 2, 3. *Terebratula Stearnsii* Dall & Pilsbry.

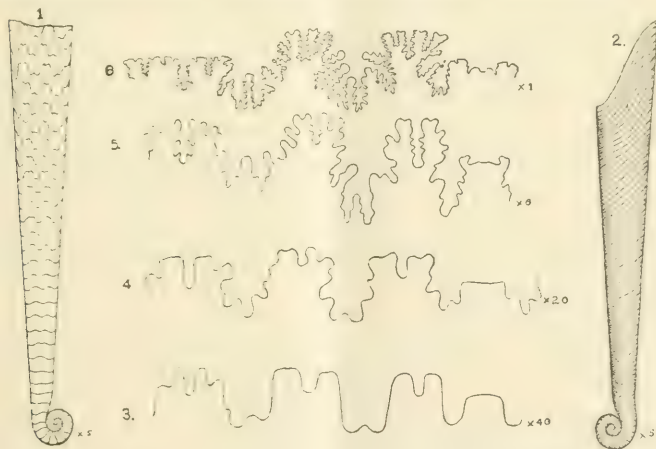
" 4, 5. *Terebratulina* var. *Kiimensis* Dall & Pilsbry.

" 6, 7. " *unguicula* Cpr., typical, a large specimen.

ON THE YOUNG OF *BACULITES COMPRESSUS* SAY.

BY AMOS P. BROWN, PHILADELPHIA.

The young of *Baculites compressus* Say has been recently discovered by me in some cretaceous marl from the vicinity of Deadwood, South Dakota. Associated with them in the same material were several species of *Baculites*, *Scaphites* and *Inoceramus*. The



young *Baculites* were of the form shown in figures 1 and 2 and varied in length from 1 to 3 cm., with a diameter of 0.4 to 2 mm. Other larger fragments with the spiral end broken off were found from

1.5 to 6 cm. in diameter. An examination of the form of the septa and suture lines showed the forms to belong to the Ammonitidæ, and by the examination of an extensive series it was possible to determine the genus and species.

The shell originates in a spiral of two to two and one-half turns, ranging in breadth from 0.8 to 1 mm. thence it extends in a straight line, tangent to the spiral (figure 1) or sometimes slightly reflexed (figure 2). The straight portion of the shell rapidly increases in diameter from 0.38 to 0.40 mm. at the spiral, to about 1.5 to 2 mm. at 2 cm. length. Many shells were covered by the nacreous shell substance, some being preserved entire, figure 2, while in others the shell had been dissolved away leaving the suture lines exposed as in figure 1. On breaking away the pearly exterior of forms like figure 2 it was found that the last chamber occupied about one-half the length of the shell. The shell of the outer whorls somewhat envelops the inner so that from the outside view the exact form of the spiral cannot be measured; it was found, however, to closely approximate the mathematical curve known as the hyperbolic spiral. That the spiral origin of this shell was not smaller than that of allied genera was demonstrated by grinding cross sections of the shell of *Scaphites Conradi* Morton; the first two turns of its spiral being 1 mm. in breadth. The siphon in *Baculites* is excentric and was found to lie near the outer margin of the spiral, being easily seen in the fractured spirals.

The species was determined from an examination of the form of the sutures which may be traced from the simple form of that of figure 1, through forms of gradually increasing complexity shown in figures 3, 4, 5, and 6, the latter being the typical sutures of the adult of *Baculites compressus* Say. In figure 5, an individual of 6 mm. diameter, the suture of the adult form is already well outlined, the specific distinction, the two deep sinuses on the right hand, being well marked.

I have been unable in the literature of the subject to find any reference to this spiral termination of *Baculites*, and believe the observation to be new. That this spiral termination has not been formerly observed is not strange in view of its small size and fragile character, it being probably broken off long before the shell had attained adult size; and it would only be preserved when as in the present instance the shells were preserved in their immature condition. This observation tends to prove that *Baculites* origi-

nated from a coiled form, and is not as supposed by some palaeontologists the original form of the *Ammonitidae*, but is rather to be looked upon as an uncoiled form developed from originally coiled parents.

ON THE GENUS *TEBENNOPHORUS* BINNEY, OR *PHILOMYCUS*, RAF.

(CONTINUED.)

BY H. A. PILSBRY.

Article III. (*Ann. Mag. N. H.*, March, 1891.)

Letter from Mr. T. D. A. Cockerell to Eds. *Ann. Mag. N. H.*

The Genus Limacella.

On pp. 184-186 of the February number Mr. Pilsbry has some remarks on the genus *Tebennophorus* or *Limacella*, to which I may perhaps be permitted to reply, taking his several points in order.

- (1) That plate of Blainville's has certainly received bad treatment. The figures have been inaccurately copied; Férussac quoted it wrongly; and now, as Mr. Pilsbry has shown, I also have erred with regard to it! There are two figures iv., labelled respectively 1 and 2. Fig. 2 is obviously *Veronicella*, but fig. 1, for which alone my reference was intended, looks like *Limacella*, though from Blainville's text it is clearly intended for *Veronicella* also. I quite agree with Mr. Pilsbry that fig. iv. no. 1 might or might not from its appearance be of the genus under discussion; and as it is stated to be *Veronicella*, there apparently remains no doubt that my reference of it to *Limacella* was erroneous. I am still of the opinion, however, that fig. v. represents the genus Americans writers call *Tebennophorus*.
- (2) There is, I think, no doubt about the slugs I described being Blainville's types; nor are these the only British-Museum slugs described by Blainville. The Museum is mentioned in the original paper.
- (3) It is very difficult to say whether inaccuracy of description, when there is no doubt what was intended, ought to condemn a name. If so, there will have to be considerable slaughter of the genera described by early authors, or, for that matter, by some recent ones. *Philomycus*, which Mr. Pilsbry thinks might be adopted, was also inaccurately defined. So far as is known there is no slug in existence really *agreeing* with the original descriptions of *Limacella* or *Philomycus* taken literally.
- (4) *Limacella*, Brard, if it is anything, is *Limax* of modern authors, not *Agriolimax*. But a genus founded for the shells only of species of the Linnean *Limax* cannot be recognized as valid, and the only authors who have adopted it are Dr. Jousseaume (1876) and Dr. Turton. The former writes *Limacella* for *Limax* auctt., and *Limax* for *Arion*; while Dr. Tur-

ton (1831) kept the name for the shells of *Limax* and allied genera, though spelling it *Limacellus*. We are told, for instance, that *Limacellus parma*, Brard, is "found in the *Limax maximus*," as though it were a sort of parasite!

- (5) I think it nearly certain that my *Limacella nebulosa* is Rafinesque's species *E. nebulosus*; but if so, of course that author described it incorrectly. Mr. Pilsbry will observe that I have given the reference with a query.

While on the subject, it may be well to mention that there is a figure and description of *Limacella lactiformis* (as *Elfortiana*) in Knight's 'Pictorial Museum of Animated Nature,' vol. ii. and fig. 2598. The figure is very bad, being a rough copy of that in Man. de Mal.; but the generic description, so far as it goes, is accurate.

T. D. A. COCKERELL.

3 Fairfax Road, Bedford Park, Chiswick, W.,
February 3, 1891.

Article IV. BY H. A. PILSBRY.

In concluding I wish simply to emphasize a few points upon which both Mr. Cockerell and myself have already touched.

(1) That Blainville's figures are so poor that Mr. Cockerell could not tell his *Veronicella* from his *Limacella*, but repeatedly confused them in his first article. Blainville's description most certainly indicates *Vaginulus* rather than *Tebennophorus*, as anyone can see by reading the translation of it given in my article. We can allow for some inaccuracy in descriptions by early authors, but we cannot suppose that when they say "black" they mean "white."

(2) As to *Limacella*, Brard. The name as used by Brard covers species of both *Limax* and *Agriolimax*. Since the Limaces are already provided with a name, why should we not adopt "*Limacella*" for the other species, namely the *Agriolimax*, as has been done in scores of similar cases? Still I do not care to advocate the use of "*Limacella*" for any group, as no definition worthy of acceptance has been given of it.

(3) As to the *Limacella nebulosa* (Raf.?) Ckll., I do not see how it is to be separated from *carolinensis* as that species is figured by Férussac. The characters given by Mr. Cockerell are wholly insufficient. Why does he not tell whether the jaw is ribbed or smooth? We would then have some clue of value. Measurements taken from variously and generally badly contracted museum specimens of slugs are practically of but little use.

(4) Mr. Cockerell truly says that *Philomycus* like *Limacella* was inaccurately defined by Rafinesque. It would be well for us to adopt Fischer's course, and write "*Philomycus* Férussac, 1821." Férussac fixes the identity of the genus with certainty by including the species *carolinensis*, which he describes and figures very well.

NOTE. The writer desires to make a more careful study of the species of *Philomycus* (*Tebennophorus*), and will be glad to receive specimens. They are best if prepared by drowning in a vessel of water from which air has been excluded. Transfer to alcohol (or whiskey) and water, the former slightly in excess. They may then be sent safely by mail in an ordinary box, if removed from the spirit and wrapped in paper or muslin wet with spirit.—H. A. P.

GENERAL NOTES.

MR. HENRY HEMPHILL has left San Diego for a summer in the north.

SHELLS OF ERIE CANAL.—Taking advantage of the annual spring cleaning of the Erie canal, I spent one day in April of the present year collecting mollusks between Ilion and Utica with the following results:

<i>Unio Tappanianus</i> Lea,	. . . . .	350 specimens.
<i>Unio rubiginosus</i> Lea,	. . . . .	15 "
<i>Unio luteolus</i> Lam.,	. . . . .	27 "
<i>Unio complanatus</i> Sol.,	. . . . .	38 "
<i>Margaritana marginata</i> Say,	. . . . .	1 "
<i>Margaritana undulata</i> Say,	. . . . .	18 "
<i>Margaritana rugosa</i> Barnes,	. . . . .	28 "
<i>Anodonta edentula</i> Say,	. . . . .	24 "
<i>Anodonta subcylindracea</i> Lea,	. . . . .	6 "
<i>Anodonta Lewisii</i> Lea,	. . . . .	91 "
<i>Physa heterostropha</i> Say,	. . . . .	150 "
<i>Campeloma decisum</i> Say,	. . . . .	46 "
<i>Goniobasis Virginica</i> Gmelin,	. . . . .	379 "
<i>Vivipara contectoides</i> W. G. Binney,	. . . . .	5 "
<i>Planorbis trivolvis</i> Say,	. . . . .	8 "
<i>Sphærium striatinum</i> Lam.,	. . . . .	12 "
<i>Limnæa catascopium</i> Say,	. . . . .	2 "

All were collected without a dredge.—Albert Bailey, *Chepachot New York*.

The late EDWARD R. MAYO of Boston left no will, but his children have generously donated his valuable conchological collection to the Boston Society of Natural History.—*E. W. R.*

COLLECTION FOR SALE.—We learn that the Collection of Dr. Hartman is for sale, together with his Conchological Library and other works on Natural History. The Collection embraces about 8000 species of Marine, Terrestrial and fresh-water shells of the best quality, many of which are rare and difficult to obtain. All parts of the world are represented in this Collection, which has taken a period of forty years to accumulate. They are all correctly named and many are mounted. Inquiries should be addressed to Dr. W. D. Hartman, West Chester, Penna.

PUBLICATIONS RECEIVED.

MOLLUSCA OF SANTA BARBARA CO., CAL., etc., by Dr. Lorenzo G. Yates. A useful contribution to our knowledge of the distribution of West Coast shells, is this extensive local catalogue. We note a number of errors in nomenclature, such as the retention of the name "*sanguineus*" for the common *Leptothyra*, etc., but such defects do not really diminish the usefulness of the list. The following are described and figured as new: *Venus Fordii* Yates, *Vertagus Lordi* Yates, *Vermiculus Fewkesi* Yates.

BEAKS OF UNIONIDÆ * * OF ALBANY, N. Y., by Wm. B. Marshall (Bull. N. Y. State Mus. II, p. 170). A careful and well illustrated study of the undulations of the beaks in Unionidæ, with especial reference to the distinguishing marks of the various species. This excellent work should be studied by all interested in Unionidæ, and extended by observers in various parts of the country. We have elsewhere expressed the opinion that excellent group characters, as well as specific characters are furnished by the beaks.—*H. P.*

THE NAUTILUS.

VOL. V.

JULY, 1891.

No. 3.

EDIBLE SHELL NOTES. FOR THE NAUTILUS.

BY ROBT. E. C. STEARNS.

In addition to the species of edible mollusks in the San Francisco markets heretofore noted by Professor Keep and myself, a recent letter from Mr. W. M. Wood of San Francisco informs me that "*Tivela crassatelloides* is very often sold in the San Francisco markets especially the 'California Market' so-called. I bought quite a lot of them a couple of weeks ago. They were of huge size about six inches in length. I observed they had some *five hundred*, or so behind the counter, for sale. The proprietor of the fish stall told me they were brought up from the vicinity (shore) of San Luis Obispo county. Near Fort Point (on the entrance to San Francisco Bay) known as 'Fort Winfield Scott' the soldier's boys at the Presidio go out near the fort and dig *Schizothærus Nuttalli*, with which their mothers make clam-chowder or clam-pies. In fact I have collected them myself." What good mothers!

Schizothærus Nuttalli beats any clam yet discovered for chowder, soup or pies. It is nearly like an oyster in consistency, has a very small foot, the proportion of hard or tough muscle being much less than in *Mya arenaria*; the mere memory of the soups and chowders I have eaten at various times, where *Schizothærus* was the grand staple, is like a gleam of sunshine through a London fog, and worth having; it is a noble and estimable clam. The California Indians, as well as those further north around Puget Sound, know them well and like 'em. In this conchological respect, I appreciate the red man's malacological taste and judgment. *Schizothærus* burrows

pretty deep, and sometimes weighs over a pound, which considering that the shells are usually rather thin and consequently light in weight, shows that the soft parts or edible portion is a jolly good junk of nutritious aliment, fit for the best conchologists on earth, and their friends also, without regard to age, sex or condition. Unlike *Mya arenaria* and *Panopæa generosa*, the end of the double siphon tube or sleeve is protected by two hard, valvular pieces. The siphons are not as long in proportion as in *Mya arenaria* nor does it ever reach the dimensions of *Panopæa*; the latter sometimes attains the weight of *fifteen or sixteen pounds*, and from tip of *extended* siphons to the opposite end, measures three feet. It will easily be seen, that it is no small job to dig out one of these deep burrowing fellows. The "meat," is very nice when parboiled and fried in batter, and as tender as a humbird's eye. Bathymetrically their station is so low or deep, that is to say usually that they are not to be procured except at very low tides. Around Puget Sound they are called "Geoducks," and they are really a delicious article of food, and a truly noble bivalve.

Tivela crassatelloides makes a good chowder or soup and is justly held in high esteem, being highly estimable and of good character among its fellows of the edible mollusca, but it is more of a "muscular Christian" than the others, and not so well adapted for frying or for pies. It is abundant at many places along the southerly coast of California, and at low tide can be plowed up in great numbers.

Washington, June 9, 1891.

ON A NEW SUBGENUS OF MERETRIX. WITH DESCRIPTIONS OF TWO
NEW SPECIES FROM BRAZIL.

BY W. H. DALL.

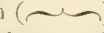
The shells which have passed under the name of *Sunetta* Link (1807, type *Donax scripta* L.) and *Tivela* Link (type *Venus corbicula* L.),—otherwise *Meroë* of Schumacher (1817) and *Trigona* Megerle (or *Pachydesma* Conrad), so far as the hinge is concerned occupy in the *Meretricinæ* much such a place as *Venus* (*mercenaria* and its allies) occupies in the sub-family *Venerinæ* of the *Veneridæ*. In both the subligamentary area is elevated and corrugated or transversely striated so that in some cases it is hardly to be termed a tooth. In both *Sunetta* and *Tivela* the shell is nearly equilateral as

regards the beaks, sub-trigonal and with a small rather rounded pallial sinus indicating short siphons. Both have compressed and inflated species; in both the epidermis in fresh specimens is conspicuous.

Sunetta differs from such species of *Meretrix* (or *Cytherea*) as *M. ovum* Hanley chiefly by the impressed lunule, excavated escutcheon, and crenulated margin of the valves. In both the subligamentary ridge is transversely striated. Allowing for the mechanical differences due to the differences in form of the cardinal margin, the hinge is essentially the same, and both have the shallow pallial sinus.

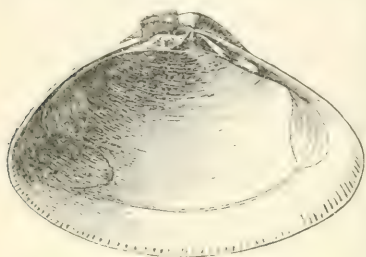
On the other hand in *Tivela* we have the cardinal margin and also the entire basal margin of the valves of *Meretrix*, while the hinge differs in that the subligamentary ridge or furrow is radiately coarsely rugose, instead of transversely regularly striate. There are flat species and inflated species as in *Sunetta*.

On the southeastern coast of South America there seems to be a group hitherto unrecognized which to the general characters of *Tivela* in regard to form, pallial sinus and hinge, unites the crenulated margin of *Sunetta*. To this section the name of *Eutivela* may be applied.

Tivela (or *Pachydesma*) *crassatelloides* Conrad, of California, has the gills small, double on each side (W-fashion) dark flesh-color; the heart is orange colored, pulsating once in ten seconds; the muscles are reddish, the mantle dark flesh-color with the edge waxen, wrinkled transversely; the foot is hatchet-shaped, livid, with a swollen, wrinkled flesh-colored basal edge, the sides below the body compressed, vertically wrinkled and granulose; the body is livid flesh-color, the liver brown, the organ of Bojanus yellow; the palpi are small, single and bifid on each side; both siphons are white with black dots at the end, the incurrent granulose and the excurrent shorter, plain-edged and smaller; they are joined together for nearly all their length. The intestine is white and there is at the entrance of the stomach a curious cartilaginous translucent hollow organ through which the food must pass, difficult to describe in words, the lid or upper part of which has the form () of a bracket, while the whole is somewhat T-shaped, or perhaps vasiform. The whole thing is about 6 mm. in longest diameter and resembles an internal mandibular apparatus more than a gizzard; at least its size would seem to be insufficient for an organ of the latter kind. I have not been able to examine specimens of the smaller *Tivelas* with the soft parts or to get any light on the features of the soft parts of *Sunetta*.

MERETRIX (EUTIVELA) PERPLEXA Stearns, n. s.

Shell waxen-white, porcellaneous, covered with a greenish-yellow epidermis recalling that of *Iphigenia brasiliensis* or *Maetra ponderosa* Jan. The surface under the epidermis is smooth or marked with lines of growth only. The figure sufficiently illustrates the other characters of the shell. The specimen figured measures 45 mm. long by 33 in height and 23 in diameter. There is an impressed



Eutivela perplexa Stearns.

lanceolate lunule 15 mm. long and about 4.5 mm. in greatest width. As in *Tivela* there is a prolongation forward, between the beaks, of the dark epidermal coating of the ligament; forming a blackish lanceolate area in front of the beaks about 5 mm. long, resembling the dark area in *Arca*. This and the rugose

subligamentary ridge are reminiscences of the period when the ancestors of *Tivela* had a more archaic type of hinge. There is no defined escutcheon.

The soft parts in alcohol present several differences when compared with *Tivela crassatelloides*.

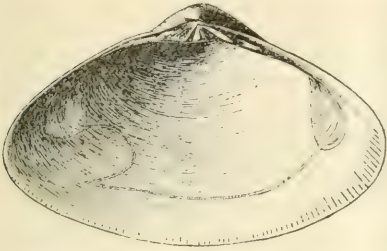
The gills are double, as in that species, but proportionately much larger and broader; the edges of the mantle are double with a groove between them; in both species they are open from the sinus to the anterior adductor; there are no papillæ or granulations in *E. Iheringi*; the foot is elongated, linguiform, and sharp-edged, without sulci or granulations; the palpi are large and distinctly paired on each side instead of being partially fused; the siphons are extremely short but rather large, the incurrent with several ranks of rather elongate tentacular processes, the excurrent with a single row of obvious papillæ; the siphons have blackish maculations toward their ends and are joined for most of their length on the adjacent sides. From the dark color of the tissues in alcohol, they were probably reddish or, at least, not white in life.

On a single shell of many, are two small brown maculæ, so that the species may sometimes be colored with brown markings. But the differences of proportion and of solidity which seem to be very constant, forbid us to unite the present species with *E. Iheringi*.

This species was dredged by the U. S. S. Albatross in several places off the mouth of the Rio La Plata in 10-15 fathoms, muddy bottom, associated with *Pectunculus* and sundry *Nuculidæ*.

MERETRIX (EUTIVELA) IHERINGI Dall, n. s.

Shell thinner, more equilateral and more elongate than *E. perplexa*, waxen-white with more or less interrupted rays of brown extending from the beaks toward the margin, modified by whitish zig-zags. The exterior is smooth, with a well marked epidermis and faint, obscure radiations corresponding to the interior marginal crenulations. The interior of the beaks and the cardinal region on both sides of them below the margin more or less marked with purplish brown. The lunule is narrow lanceolate and faintly impressed. The figure illustrates the characters of the single valve upon which the



Eutivela Iheringi Dall.

species is founded, which measures 41 mm. long, 27 high, while the double diameter would be about 18 mm.

It is named in honor of Dr. H. von Ihering, from whom it was received, and by whom it was collected on the beach near Santa Caterina in southeastern Brazil in about latitude 26° south.

 DESCRIPTIONS OF TWO NEW SPECIES OF UNIO FROM FLORIDA.

 BY WILLIAM A. MARSH.

Unio Singleyanus.

Shell smooth, oval, slightly depressed, inequilateral; valves rather thick, squarish before, rounded behind; beaks small and flat; epidermis yellowish-brown, shining, with or without rays, usually rayless. Cardinal teeth crenulate, oblique, single in right valve, double in left. Lateral teeth short and straight; anterior cicatrices small, deep, not confluent, posterior cicatrices confluent, slightly impressed; nacre white, iridescent.

Habitat. A small creek near Pilatka, Florida.

Remarks. Seven shells of this species were sent to me by T. L. Cunningham a number of years ago. This species belongs to the *parvus* group, but differs very much from any other member of that group in the yellowish color of its epidermis, in its peculiar outline and much flattened form of the females. Some specimens are cov-

ered with rays, others without rays and having a bright yellow shining epidermis. In general outline it approaches *U. marginis* Lea, but is not pointed anteriorly like that species and differs altogether in the color and texture of the epidermis.

I name this shell after my friend Mr. J. A. Singley of Texas, a gentleman who has done very much towards collecting the mollusca of that state.

Unio Ferrissii

Shell oblong, inflated, smooth before, slightly plicate posteriorly, rather thick and solid, epidermis dark green or black and shining, with green capillary rays, sometimes rayless, squarish before, pointed behind, umbonial slope raised, obtusely rounded. Cardinal teeth compressed, thick and solid, oblique, single in right valve, double in left, striate. Lateral teeth short and slightly curved, anterior cicatrices not confluent, very deep, posterior cicatrices distinct, naere pink and iridescent.

Habitat. A small creek near Pilatka, Florida.

Remarks. Several years ago I received two shells of this species from Mr. J. B. Upson, at the time I supposed them to be a variety of *U. Anthonyii* Lea, but having some doubts as to their belonging to that species, I sent them to Mr. Chas. T. Simpson of the Smithsonian Institution, who after a very careful examination, pronounced them distinct. They differ from *U. Anthonyii* Lea in being a much smaller species but more inflated and solid, less wide, more cylindrical; they are not angular over the posterior slope, with a very different epidermis and naere and much heavier teeth.

I name this shell after my friend Mr. Jas. H. Ferriss of Joliet, a gentleman who has done much towards bringing to light many interesting species from our own state.

THE SLUGS OF BRITISH COLUMBIA.

BY T. D. A. COCKERELL.

Mr. H. F. Wickham sent me some slugs from Victoria, Vancouver Island, in November, 1889; and the Rev. J. H. Keen recently sent some slugs from British Columbia to the British Museum, so I have been able to examine sufficient material to offer a list of the slugs of that province, with notes:

(1) *Agriolimax campestris* subsp. *hyperboreus* (Westerlund). Mr. Binney sent me a specimen of this collected at Comor, 140

miles north of Victoria (Taylor). It is figured in 3rd suppl. Terr. Moll. U. S., Pl. viii, fig. f. On p. 205 of his 3rd suppl. Mr. Binney refers to a slug from British Columbia, apparently *L. hemphilli* W. G. Binney. *Limax hemphilli* is, I think without doubt, a variety of *Agriolimax Berendti* (Strebel), and was hardly to be expected so far north.

In my copy of Pl. viii. of Mr. Binney's 3rd Suppl. Terr. Moll., figures of *Ag. hemphilli* and *Ag. montanus* have some appearance of dark lateral bands, owing to the ink having run in printing. All the four forms of *Agriolimax* figured on that plate resemble *Ag. levis* in general appearance, and of course, have no dark bands. I found them to differ slightly in the position of the longitudinal line or groove on the margin of the foot, and the figures given of the foot-margins were intended to show this difference. It will be seen that in *montanus* the line is near the upper edge of the margin, in *occidentalis* it is lower, in *hyperboreus* it is about median, and in *hemphilli* it is nearest the lower edge. I have not, however, examined this character in a sufficient number of specimens to say whether it is of really of classificatory value.

(2) *Prophysaon pacificum* Ckll.: Victoria, Vancouver Island (Wickham). Figured in Binney's 3rd Suppl. Terr. Moll. U. S., Pl. vii. In this work, Pl. vii, fig. e, is the jaw of *P. humile*, and fig. f that of *P. pacificum*: these names are unfortunately transposed in the plate, on p. 225. *P. pacificum* was described from two specimens, one of which is now in the British Museum, and the other in the U. S. National Museum.

(3) *Prophysaon andersoni* (Cooper) var. *hemphilli* (B. & B.): British Columbia, six specimens (*Rev. J. H. Keen*).

(3b) *Prophysaon andersonii* var. nov. *pallidum*. Paler, ochreous, the bands on mantle evanescent, reticulation on body not dark, back not darker than sides, neck pale. Two specimens from British Columbia (*Rev. J. H. Keen*), the largest 46 mill. long (in alcohol). One has the tail cut off, in the same way as has been described in other species of the genus. All the eight examples of *Prophysaon* sent by Mr. Keen have the sole strongly wrinkled.

(4) *Ariolimax columbianus* (Gould) forma *typicus*. Without black spots. British Columbia, two specimens (*Rev. J. H. Keen*).

(4b) *Ariolimax columbianus* forma *maculatus* Ckll. This spotted form seems to be rather more frequent than the type.¹ Mr. Keen's

¹ *Ariolimax* subsp. *californicus* forma nov. *maculatus* is a precisely similarly spotted form of the Californian subspecies. There is an example in the British Museum from Mr. W. G. Binney, 45 mm. long.

sending contains four specimens. Mr. Wickham sent me two from Victoria: one being immature, only 21 millim. long; in this small specimen the sole was not visibly divided into tracts. There is also a specimen of *f. maculatus* in the British Museum from Vancouver I. (*Lord I. Russell*; coll. by the Boundary Commission), which is 63 mill. long (in alcohol), tail well keeled for 18 millim.; a large spot on mantle; sole with median area smooth though wrinkled, lateral area rough; jaw dark, with 15 ribs.

(4c) *Ariolimax columbianus* forma nov. *niger*. Entirely black, except the sole, which is rather olivaceous. One specimen, 57 mill. long (in alc.), from British Columbia (*Keen*).

Mr. H. F. Wickham was so good as to send me some notes on the Victoria slugs, as follows: "The very large slugs [*A. columbianus* f. *maculatus*] from Victoria are found in the heavy woods on the island in rather damp situations, especially around and in the cracks of rotten logs. In damp weather I have seen them crawling around on logs and on the ground. The little ones [*P. pacificum*] from Victoria also occur under logs, but I got them in much damper places, especially under logs in ditches by the roadsides, and few or none in the woods" (*in litt.*, Dec. 12, 1889.)

LIST OF LAND AND FRESH-WATER MOLLUSCA COLLECTED
IN JAMAICA.

BY C. W. JOHNSON & WM. J. FOX.

The following is a list of the mollusca obtained on our recent trip to Jamaica, during a part of April and June. As the species are extremely local in their distribution, and our collecting confined to the eastern part of the Island, and time largely occupied in collecting insects, this list, represents but a small part of the Island fauna.

Collections were made near Kingston, Bogwalk in the Parish of St. Catherine, Morant Bay, Manchioneal, Port Antonio, Hope Bay and Swift River. At Kingston, *Orthalicus undatus* was abundant on the trees, ascending to the height of ten or twelve feet; as it was very dry weather, they were all tightly closed with an epiphragm, and so firmly attached to the bark that it required considerable force to remove them. *Helix invalida*, *Cylindrella brevis* and *Tudora armata* were also numerous. Though the shells were quite plentiful we did not succeed in finding a living *Sagda jayanus*. At Port Antonio, *Tudora augustæ*, *Cyclotus Portlandiensis* and *Hyalosagda*

similis, were the most abundant species, while near Hope Bay, *Helix acuta*, *Cylindrella alba* and *Lucidella aureola* predominated. We desire to express our thanks to Mr. Henry Vendryes of Kingston, for his kindness in directing us to collecting grounds, for valuable information regarding distribution, and for specimens.

LIST OF SPECIES.

Oleacina (*Varicella*) *leucozonius* Walch. Portland? This species was given to me by a gentleman in Port Antonio.

Oleacina procera C. B. Ads. Bogwalk. Two specimens.

Oleacina nemorensis C. B. Ads. Near Manchioneal.

Oleacina similis C. B. Ads. Bogwalk.

Oleacina (*Melia*) *propinqua* C. B. Ads. Near Hope Bay and Swift River.

Oleacina perplexa C. B. Ads. Near Hope Bay and Swift River.

Oleacina læviuscula. Near Hope Bay and Swift River.

Zonites (*Proserpinula*) *discoidea* C. B. Ads. Near Hope Bay.

Zonites opalina C. B. Ads. Bogwalk.

Helix (*Sagda*) *Jayanus* C. B. Ads. Long Mt. Kingston and Bogwalk.

Helix (*Sagda*) *connectans* C. B. Ads. Long Mt. Kingston.

Helix (*Hyalosagda*) *similis* C. B. Ads. Morant Bay, Port Antonio and Swift River.

Helix (*Hyalosagda*) *Haldemaniana* C. B. Ads. Morant Bay, Manchioneal.

Helix (*Microphysa*) *turbiniformis* Pfr. Bogwalk and Port Antonio.

Helix (*Microphysa*) *peraffinis* C. B. Ads. Port Antonio.

Helix (*Microphysa*) *vortex* Pfr. Port Antonio.

Helix (*Microphysa*) *diminuta* C. B. Ads. Port Antonio.

Helix (*Microphysa*) *perdepressa* C. B. Ads. Kingston.

Helix (*Lucerna*) *acuta* Lam. Near Hope Bay.

Helix (*Lucerna*) *acuta* var. *nobilis* C. B. Ads. Bogwalk.

Helix (*Lucerna*) *acuta* var. *ingens* C. B. Ads. Near Manchioneal.

Helix (*Lucerna*) *valida* C. B. Ads. Near Hope Bay.

Helix (*Lucerna*) *invalida* C. B. Ads. Near Long Mt., Kingston.

Helix (*Lucerna*) *sinuosa* Fér. Bogwalk.

Helix (*Dialeuca*) *subconica* C. B. Ads. Bogwalk, Port Antonio and Hope Bay.

Helix (*Dialeuca*) *nemoraloides* C. B. Ads. Bogwalk.

Helix (*Dialeuca*) *nemoraloides* var. *gossei* C. B. Ads. Bogwalk.

Helix (*Cysticopsis*) *tumida* Pfr. Bogwalk.

Helix (*Cysticopsis*) *tenerrima* C. B. Ads. Bogwalk.

- Orthalicus undatus* Brug. Kingston.
Stenogyra octona Linn. Common in all the localities.
Stenogyra octonoides C. B. Ads. Common in most of the localities.
Cylindrella elongata Chemn. Bogwalk.
Cylindrella alba C. B. Ads. Near Hope Bay and Swift River.
Cylindrella rubra C. B. Ads. Swift River.
Cylindrella Dunkeriana Pfr. Bogwalk.
Cylindrella brevis Fér. Near Rockfort and Kingston.
Cylindrella sanguinea Pfr. Bogwalk.
Cylindrella rosea Pfr. Near Manchioneal and Port Antonio.
Cylindrella lata C. B. Ads. Bogwalk.
Leia Maugeri Wood var. *striatula* C. B. Ads. Bogwalk.
Pupa fallax Say. Kingston.
Pupa contracta Say. Near Hope Bay.
Succinea latior C. B. Ads. Common in all the localities.
Succinea angustior C. B. Ads. Morant Bay.
Vaginulus sloanii Fér. Port Antonio.
Vaginulus occidentalis. Port. Antonio.
Planorbis affinis Ad. In a spring near Rockfort and Kingston.
Amnicola ? sp. ? Brackish water near Kingston.
Hemisinus lineolatus Wood. Rio Cobre at Bogwalk.
Ampullaria fasciata Lam. Rio Cobre at Bogwalk.
Geomelania procera C. B. Ads. Near Hope Bay and Port Antonio.
Adamsiella Grayana C. B. Ads. Bogwalk.
Tudora armata C. B. Ads. Rockfort and Kingston.
Tudora fecunda C. B. Ads. Rockfort and Kingston.
Tudora maritima C. B. Ads. Near Manchioneal.
Tudora fascia Gray. Bogwalk.
Tudora Angustæ C. B. Ads. Port Antonio.
Tudora Angustæ var. *rufilabrum*. Swift River.
Cyclotus Portlandiensis Chitty. Port Antonio.
Helicina megastoma C. B. Ads. Port Antonio and Hope Bay.
Helicina neritella Lam. Port Antonio and Hope Bay.
Helicina depressa Gray. Bogwalk.
Alcadia solitaria C. B. Ads. Port Antonio.
Lucidella aureola Fér. Bogwalk, Port Antonio and Swift River.
Lucidella nana Pfr. Port Antonio and Hope Bay.
Stoastoma chittiyana C. B. Ads. Port Antonio and Hope Bay.

[CONTRIBUTED.]

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

JUNE 23, 1891.

Owing to long continued illness in the family of the President and absence of the Secretary in Jamaica, we have been unable to communicate our usual monthly notes to the NAUTILUS. For the same reason correspondence has been delayed and the affairs of the Association, so far as the President and Secretary are concerned have dragged somewhat. Members have been very indulgent and their kindness is appreciated.

The Association still grows. In fact, its rapid growth has astonished its projectors and has shown that such an organization was needed. American Conchologists were unacquainted with each other and in many instances had no one with whom to confer in their studies. Now they have at their command scores of willing associates, ready to extend them aid in solving disputed problems or in acquiring knowledge. Those members who have corresponded most perceive how valuable the Association has been. Before long we will not only have almost every American Conchologist enrolled, but many students and beginners will be induced to take up the study and collection of shells.

Next month we will resume the publication of the lists of new members, donations to the United States Collection etc.

Members desiring to donate shells to the United States Collection would do well first to send their *lists of species* to the President who would mark off the species already received and thus save duplication. Send all shells to the President, care of Academy of Natural Sciences, Philadelphia.

The annual election of officers of the Association took place, by correspondence, upon the 1st Wednesday of June, and the officers assumed their duties upon June 15th. Except a few scattering votes, by the officers and others, the present officers received all the votes polled, and were therefore re-elected for another year. They wish to return their thanks for the many kind words of approval of their conduct and for the great interest taken by the members in the election. The positions involve much hard work and the giving of much time to the affairs of the Association but the work is lightened by the ready assistance and co-operation of the members.

A new edition of the pamphlet "List of Members" of the Association, is in preparation. So many new members have been elected since its publication (October 1, 1890), that a new edition is much needed. As soon as completed a copy will be sent to every member.

Members desiring to propose new members should do so at an early date, so that their names may be included in the new "List of Members."

Miss C. A. Shepard of New Britain, Conn. and C. A. Hargrave, Danville, Ind. are Associate Editors of "The Observer" a natural history monthly, published at Portland, Conn.

James H. Ferris, recently elected a member, is Editor of the Daily News, Joliet, Ill. He has chosen for his subject, the Land and Fresh Water Shells of Illinois.

William McCormick, Palm Beach, Fla. is spending the summer North, and stayed, en route, some days in Philadelphia.

John Ritchie Jr., Boston, Mass., has fortunately recovered from a serious attack of typhoid fever. Accompanied by his wife, he spent nearly a week in Philadelphia during the present month, coming and returning by steamer.

Francisco E. Blanes, Key West, Fla., is now on a visit to Cuba.

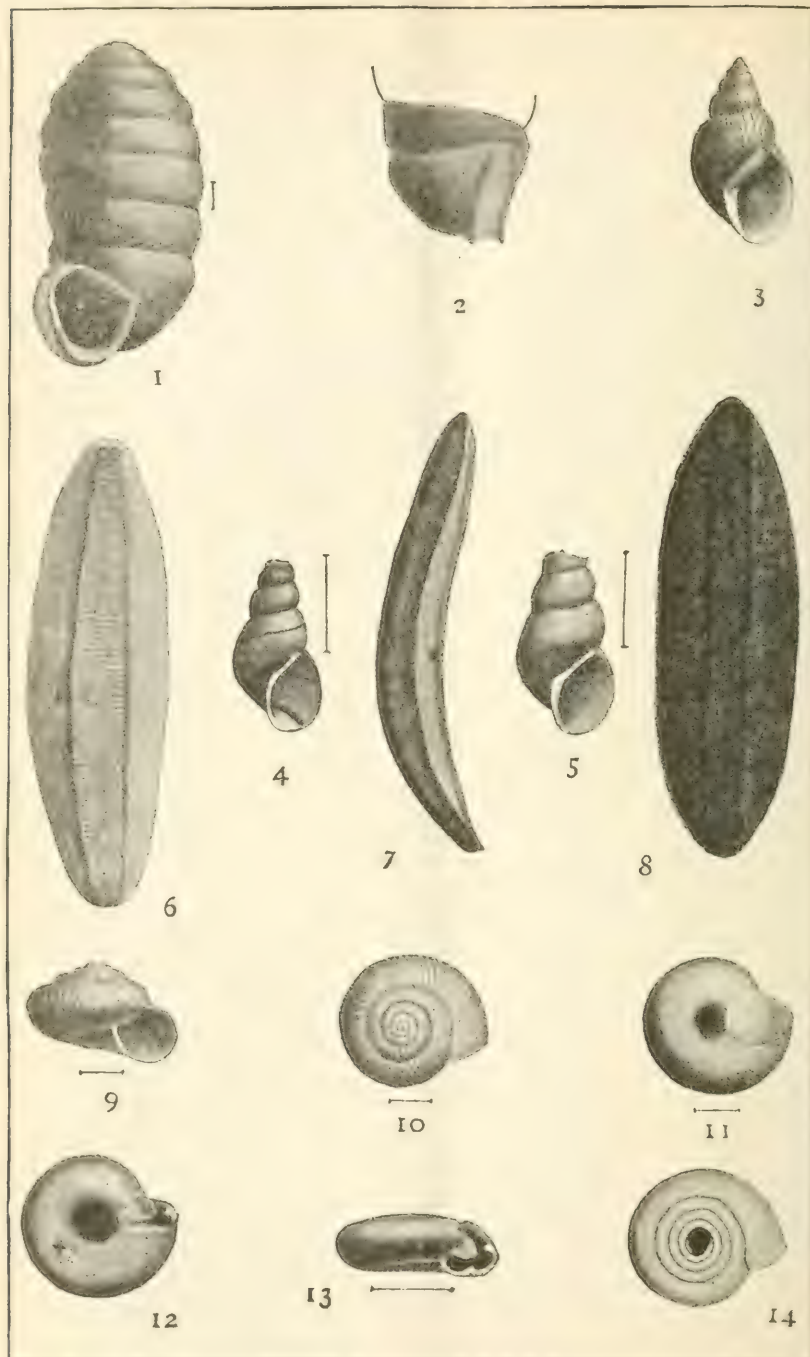
I. Gregor has finished his winter's business in St. Augustine, Fla. and is now at Cuyahoga Falls, Ohio. He stopped in Philadelphia for a few days on his way home.

Dr. Lorenzo G. Yates, Santa Barbara, Cal. has changed his subject to "West Coasts shells." Harry E. Dore, Portland, Oreg. a new member, has chosen the same subject. Willard M. Wood, San Francisco, Cal., a new member, has chosen "California Mollusca" as his subject.

W. S. Teator, Upper Red Hook, N. Y., recently paid a visit to Philadelphia.

Rev. Joseph C. Carrier is Professor of Natural Sciences in the College of St. Laurent, near Montreal, Canada.

WANTED. The June number of *The Nautilus*, Vol. III, 1889. Ten cents per copy will be paid.—C. W. Johnson, *Manager of the Nautilus, Philadelphia.*



PILSBRY, ON NEW AMERICAN MOLLUSKS.

THE NAUTILUS.

VOL. V.

AUGUST, 1891.

No. 4.

ON *HELIX HARFORDIANA* COOPER, AND OTHER SHELLS.

BY HENRY A. PILSBRY.

The accompanying plate¹ illustrates a number of species described originally in *THE NAUTILUS* and elsewhere, as follows :

Figs. 1, 2, *Pupa syngenes*.

Pupa syngenes Pils., *THE NAUTILUS* IV, p. 3, May, 1890 ; *Proc. Acad. Nat. Sci. Phila.*, 1890, p. 296.

This is the first sinistral *Pupa* described from America. It is from Arizona.

Fig. 3, *Bulimulus Ragsdalei*.

B. Ragsdalei Pils., *Proc. Acad. Nat. Sci. Phila.*, 1890, p. 63, 296 ; *THE NAUTILUS* IV, p. 122, March, 1890.

Northern Texas.

Figs. 4, 5, *Goniobasis Crandalli*.

Gon. Crandalli Pils., *Proc. Acad. Nat. Sci. Phila.*, 1890, p. 301. Mammoth Springs, Arkansas.

Figs. 6, 7, 8, *Vaginulus Schivelyæ* Pils.

Bermuda.

Figs. 9, 10, 11, *Zonites Shimekii*.

Z. Shimekii Pils., *THE NAUTILUS*, IV, p. 3, May, 1890, *Proc. Acad. Nat. Sci. Phila.*, 1890, p. 297.

This species has been familiar to me for some years, under the name of *Zonites limatulus*. It agrees with that form in the number of

¹ Reprinted by permission from *Proc. Acad. Nat. Sci. Phila.*

whorls and sculpture, except that the *Shimekii* is more strongly, regularly ribbed above. It differs from *limatulus* in being far more robust, more elevated, with rounder mouth and narrower, deeper umbilicus. Upon comparing specimens of the two species, I am surprised that they were ever confused; for, except in sculpture, the *Z. Shimekii* is far more like *Z. nitidus* than to *Z. limatulus*. The specimens described and figured were collected by Prof. B. Shimek, of Iowa City, Iowa.

This form is interesting as being the only well-defined species of Loess fossil which seems to have become extinct; although there are a number of others, such as *Helicina occulta* and *Patula strigosa* var., which survive in greatly reduced numbers in a few limited localities, or only in a distant part of the country.

This species is rather widely distributed throughout the Loess formation of Iowa and eastern Nebraska. The name is bestowed in memory of the many happy days spent together by Prof. Shimek and the writer, then college classmates, hunting fossils and shells.

Fig. 12, 13, 14, *Helix* (*Polygyrella*) *Harfordiana*.

Dædalochila Harfordiana Cooper, Amer. Journ. of Conch., vol. V, pt. 4, 196, plate 17, fig. 8. See also *tom. cit.*, p. 214.

Helix (*Dædalochila*) *Harfordiana* Coop., Tryon, Manual of Conchology, 2d Series, vol. III, p. 130, pl. 27, figs. 55-57.

Polygyra Harfordiana Coop., W. G. Binney, Manual of N. A. Land Shells, p. 114, fig. 81, *but not the description!*

Not *Triodopsis Harfordiana* Cp., W. G. Binney, Terr. Moll. U. S. etc., V, p. 309, fig. 203, 1878.

This shell has been so much misunderstood and so incorrectly figured that I feel impelled to refigure it and to offer a few suggestions concerning the systematic position of the species. It was discovered in the year 1869 by Mr. W. G. W. Harford in the "Big Tree" district, Fresno County, California. The locality is an elevated one, lying 6500 ft. above the sea level, in lat. 37°.

In thus devoting space to the consideration of this question of systematic position, I do not wish to be understood to attach any great importance to those divisions of our *Helices* which some authors call *sections*, some *subgenera*, and still others designate as full fledged *genera*. I am fully aware that many of these divisions coalesce; we can no more trace the separating line between their species than we can unmix mingled milk and water. Thus, the species *Texasiana*, *triodontoides* and *Levettei* bridge the space between

Polygyra and *Triodopsis* : *Mullani*, *appressa*, etc., form passages from *Triodopsis* to *Mesodon* ; and through *germana* with its allies on either side, *Mesodon* flows into *Stenotrema*. The recognition of the fact that these sections are all varying manifestations of one type, and that a native American one, lead me to associate them under the oldest name, *Polygyra*, in my check-list of our land shells.¹

So much for the one side. And on this side there is full as much danger in holding extreme views, as on the side of excessive analysis. Let us not profess sweeping views on coalescence of minor groups until we have the species which actually show transition ; and (to pass from generalizations to a special case), it may be noted here that while the species of the *Polygyra* + *Triodopsis* + *Mesodon* + *Stenotrema* group, invariably have a reflected lip, the two species belonging (as I claim) to *Polygyrella* have a blunt lip, not in the least expanded or reflexed. I prefer to keep very different things apart.

Dr. Cooper's original description is excellent, but the figures are bad. The latter are copied by Tryon in the Manual of Conchology. Binney described a wholly different shell in his two publications—a shell which has, he states, an expanded lip. In his Manual of American Land Shells the species is said by him to have four whorls and is placed in *Polygyra*. Still later (3rd Supplement to Terr. Moll. V.) Mr. Binney seems to entertain a suspicion that the *Triodopsis Roperi* Pils. (which he places in *Polygyra*!) is the same species. An examination of the type would doubtless have convinced Mr. Binney that it is, as Dr. Cooper states in his original description, most intimately allied to *Polygyrella polygyrella*. Figure 81 of the Manual of American Land Shells is incorrect in showing the parietal tooth too far within the aperture. The original figures have the same defect.

With *Polygyrella polygyrella*, this species agrees in general form, color, sculpture and texture, as well as in the form of the aperture and the *blunt, not at all expanded* lip. In *texture* and character of the lip, both species are very different from *Polygyra* and *Triodopsis* ; the species of these last two sections having the lip expanded and reflexed.

The section *Polygyrella* may be defined thus :

Shell disk-shaped, the spire nearly flat, periphery rounded, even in the young ; umbilicus wide within, showing all the whorls. Texture somewhat vitreous and subtranslucent ; ribbed-striate above,

¹ Proc. Acad. Nat. Sci. Phila., 1889, p. 193.

polished beneath; color yellow, yellowish-green or light brown. Whorls six to eight, narrow, slowly widening, the last a trifle descending in front. Aperture subtriangular, oblique; peristome blunt, not expanded, thickened within, with or without lip teeth; parietal wall bearing a stout, triangular, erect entering tooth.

The species may stand as follows:

(1.) No lip-teeth; body-whorl with several internal pairs of denticles visible through the base. *H. polygyrella*.

(2.) Peristome with two lip-teeth; no denticles inside the body-whorl. *H. Harfordiana*.

Dr. Cooper's ingenious supposition that the internal denticles of *H. polygyrella* are "swallowed" lip teeth I find to be erroneous, as they are formed quite a distance within the whorl, not at the edge of the advancing lip.

H. Harfordiana has been found only at the spot named above, and only two specimens are known; that figured on the plate accompanying this paper, and one other, a young shell, in the collection of Dr. Cooper. The earlier whorls are broken in the type specimen.

ON SOME MARINE MOLLUSKS FROM THE SOUTHERN COAST
OF BRAZIL.

BY DR. W. H. DALL.

In the preliminary report on the mollusca obtained on the voyage of the Albatross around Cape Horn (Proc. U. S. Nat. Mus. XII, No. 773, pp. 219-362, 1889) I enumerated a number of Antillean mollusks which were found to extend their range from the coast of the United States to the eastern shores of Brazil, to the Abrolhos Islands and even further south. Subsequently a few others, also from the Albatross collection, were noted as extending to Brazil, in Bull. 37, U. S. Nat. Museum. Since then I have received from Dr. H. von Ihering, of Porto Allegre, a small collection of very poor, beach-worn material, largely in fragments, but still identifiable, which still further enlarges the range of some of the species, and adds to the list of species some of the common forms of the United States coast which had not before been suspected to reach such southern latitudes. It is probably that the great volume of fresh

water issuing from the Rio La Plata acts as an effective barrier against the more southern extension of shallow water species which may reach to its northern point of entrance; so that we may expect that few, if any, of these northern stragglers will be found south of Montevideo.

In the following list will be found the names of the species received from Dr. von Ihering and a few, not hitherto noted, from the Albatross collection, the whole embracing between fifty and sixty species, a good many of which have not hitherto been identified from the region in question, and two of which appear to be new to science. The northern range of most of the species common to the northern Antilles and to the coast of the United States will be found entered against the name of the species in Bulletin 37 above referred to. In some cases the identity of the species has hitherto been obscured by the southern specimens having been separately named; as in the case of *Tagelus platensis* Orb. which is positively indistinguishable by any character from *T. caribæus*.

The localities are Santa Caterina near San Francisco, in about Lat. 26° S.; Rio Grande do Sul in S. Lat. 32° 30'; and the mouth of the Rio La Plata near Montevideo and Tozitos in about S. Lat. 35°.

- Ostrea virginica* Gmelin var. *puelchana* Orb. Santa Caterina.
- O. cristata* Born. Santa Caterina.
- Placunanomia rudis* Brod. Santa Caterina.
- Modiola sulcata* Lam. Rio Grande do Sul.
- Mytilus canaliculus* Hanley (edulis of E. A. Smith). Rio Grande do Sul.
- Mytilus magellanicus* Reeve. Montevideo.
- Arca candida* Chemnitz. Santa Caterina.
- Arca martinii* Recluz. Santa Caterina.
- Arca imbricata* Bruguière. Santa Caterina.
- Arca americana* Gray. Santa Caterina.
- Arca incongrua* var. *brasiliensis* Orb. Santa Caterina.
- Lucina jamaicensis* Lam. Santa Caterina.
- Divaricella quadrisulcata* Orb. Santa Caterina.
- Chama congregata* Conrad. Santa Caterina.
- Cardium brasiliensis* Lam. Santa Caterina.
- Cardium muricatum* L. Santa Caterina.
- Dione circinata* Lam. Santa Caterina.
- Dione purpurata* Lam. (+ *ligula* Anton). Rio Grande do Sul.

- Cytherea rostrata* Koch (+ *tehuelca* Orb.) Santa Caterina.
Anomalocardia macrodon Desh. Santa Caterina.
Tivela mactroides Born. Santa Caterina.
Tivela fulminea (Val.) Philippi. Santa Caterina.
Tivela ventricosa Gray. Rio Grande do Sul.
Eutivela perplexa Stearns, n. s. Off' Rio La Plata, 11½ fathoms.
Eutivela iheringi Dall, n. s. Santa Caterina.
Donax rugosus Lam. Rio Grande do Sul.
Donax owenii Gray. Montevideo and Maldonado.
Iphigenia brasiliensis Lam. Santa Caterina.
Tagelus gibbus Spengler (+ *T. platensis* Orb.). Rio Grande do Sul.
Soletellina rufescens Chemn. Santa Caterina.
Sanguinolaria rosea Lam. Santa Caterina.
Tellina versicolor Cozzens. Santa Caterina.
Macoma constricta Bruguière. Santa Caterina.
Macra brasiliana Lam. Santa Caterina.
Macra scalpellum Deshayes. Santa Caterina.
Macra symmetrica Deshayes. Santa Caterina.
Macra byronensis Gray. Montevideo.
Macra? *isabelleana* Orbigny. Santa Caterina.
Macra alata Lam. Santa Caterina.
Labiosa canaliculata Say. Santa Caterina.
Mesodesma mactroides Deshayes. Rio Grande do Sul.
Pholas campechiensis Gmelin. Santa Caterina.
Barnea costata Linné. Santa Caterina.
Pisania variegata Gray. Santa Caterina.
Murex senegalensis Lam. Santa Caterina.
Purpura hæmastoma Linné. Santa Caterina.
Litorina irrorata Say, var. *columellaris* Orb. Santa Caterina.
? *Paludestrina australis* Orb. Montevideo.
Crepidula aculeata Gmelin. Santa Caterina.
Polynices brunnea Link. Santa Caterina.
Sigaretus maculatus Say. Santa Caterina.
Sigaretus perspectivus Say. Santa Caterina.
Acmæa onychina Gould. Santa Caterina.
Fissurella rosea Gmel. Santa Caterina.
Glyphis cayennensis Lam. Santa Caterina.

NOTE ON PUPA MUSCORUM LINNE.

BY H. A. PILSBRY.

There has been considerable discussion regarding the proper name of this species, some authors preferring the name "*marginata* Drap." In all disputed questions regarding Linnean names, we may turn with confidence to Hanley's book "The Shells of Linnaeus." Hanley bestowed a vast amount of study on the actual types of Linnaeus' own collection. He says of this species:

"*Turbo Muscorum*. This shell (pl. IV, fig. 6) still remains in the collection, is enclosed in a paper inscribed in the hand of Linnæus, and is the sole species in the entire cabinet which at all agrees with the diagnosis. It is a curious edentulus variety of the *Pupa marginata* of Draparnaud, to which species it had been assigned by Nilsson, in his valuable treatise upon the land and fresh-water shells of Sweden, a work especially illustrative of the *Helices* and *Turbines* of the 'Fauna Suecica.' From a sentence in the last mentioned work, 'aperture ovate-acuminata, mucrone obtuso' we are led to imagine that our author was aware of the frequent presence of a denticle in the mouth of the shell, although in the 'Systema' he had termed it edentulous. None of the Linnean examples, however, are provided with a tooth; yet in England, where this *Pupa* is most abundant, it is rarely that we obtain an example which is not thus furnished."

Hanley figures the type shell of Linnæus; and we have, it seems, little excuse for rejecting the name *muscorum* in favor of the later *marginata*. The following tabulation of the varieties of this species I take from a MSS. of T. D. A. Cockerell:

"In the number of teeth or lamellæ in the aperture of the shell, this species presents a beautifully graduated series from none at all to three, as follows:

- a. *edentula* Moq-Tand. No teeth. Colorado, Massachusetts, Europe.
- b. *unidentata* Stabile. One tooth on parietal wall.
- c. *bigranata* Rossm.=*sterri* v. Voith. Two teeth. This form is figured by Binney, Man. Amer. Land Shells, p. 78, fig. 40.
- d. *blandi* Morse. Three teeth, one being on columella.

"*Bigranata* and *blandi* are often considered as species apart from *marginata*, but I think on wholly insufficient grounds."

Mr. Cockerell is not responsible for the name *muscorum* as applied to this shell. The first variety, *edentula* Moq.-Tand., is of course equal to the typical *muscorum*.

NOTES AND EXCHANGES.

The following extract from a letter written to the Ed. by Dr. W. D. Hartman, will be of interest:

"I have just learned through Mr. Rossiter, of the Island of Noumea, that Mr. de Latour and his son (from whom I have received so many new shells from Aura Island, New Hebrides) have been murdered by natives; Mr. Garrett was wont to tell me of the great danger to be encountered by these collectors in these islands from the natives. When he was collecting in some of these islands he was obliged to be a walking arsenal and would never trust a native behind his back for fear of being stabbed and dragged off into the bushes and eaten.

I much regret the loss of de Latour as a collector. The last box he collected was lost in a vessel that was wrecked, and after floating about on the ocean was wafted to shore, and was found and sent to Mr. Rossiter."

Some of the shells contained in this box were figured in Dr. Hartman's last paper in the Proceedings of the Academy of Natural Sciences of Philadelphia.—Ed.

WANTED.—Atlantic and Gulf Coast Shells in exchange for land and fresh-water shells of the Mississippi Valley.—*Elwood Pleas, Dunreith, Indiana.*

We learn that our valued correspondent, Mr. T. D. A. Cockerell, has been appointed Director of the Natural History Museum at Kingston, Jamaica. Mr. Cockerell has many warm friends among the conchological fraternity of America, who will be glad to hear that he has been called to a field so rich for the Naturalist.—*Ed.*

Correspondence invited, with view to exchange of Conchological specimens. Desiderata: Florida, Texas, California and West Indian land shells. Offers: British, European and South African land, fresh-water and marine.—*C. L. Smout, 40 Braybrook Road, Hastings, England.*

POLYGYRA (TRIODOPSIS) MULLANI *var.* **OLNEYÆ**.—Shell very much depressed, the spire nearly flat; aperture transversely oval, the upper and basal lips parallel; peristome completely revolute, more curled over than in any other form I have seen; basal lip with a white callus but no tooth; no trace of a tooth on the outer or upper lip; parietal wall having a small tooth. Alt. 6, diam. 13 mill.; oblique alt. of aperture $6\frac{1}{2}$, width $8\frac{1}{2}$ mill., measured outside of peristome. The specimens are from Spokane, Washington, sent by Mrs. Mary P. Olney.—*H. A. P.*

THE CONCHOLOGIST is the title of a new periodical published at Leeds, England. It is issued quarterly and is devoted for the greater part to the mollusks of Great Britain. The second number, just issued, contains the following articles: Note on the locality of *Helix mandarina* Gray, by E. A. Smith; The glacial Period and British non-marine mollusca, H. E. Quilter; The Land and Fresh-water mollusca of Oxfordshire, W. E. Collinge; Adventitious Protection in Fresh-water mollusca, C. Clare Fryer; On the Burrowing Habits of Testacella, C. D. Horsman. *The Conchologist* is edited by Mr. W. E. Collinge, of Leeds, England. We wish it success.

ON SOME NEW * * WEST AMERICAN SHELLS, ETC., by WM. H. DALL. (Proc. U. S. Nat. Mus. 1891, p. 173-191; three plates.) The dredgings of the *Albatross*, as well as a number of West Coast collectors, Mr. J. J. Rivers, Miss Ida M. Shepard, Mrs. M. Burton Williamson and others, have contributed the shells described and illustrated in this paper. The species of *Eupleura*, both East and West, are first discussed and figured. *Nassa californiana* Conr., originally described as a Miocene fossil under the generic name of *Schizopyga* by Conrad, has been found living from Drake's Bay to Cerros Island, 25-65 fms. *Fusus Kobelti* Dall, *F. Harfordi* Stearns, *Trophon triangulatus* Cpr. and *clementia subdiaphana* Cpr. are figured for the first time. *Trophon Cerrosensis*, *Cancellaria Crawfordiana* and *Tellina Idæ*, *spp. nov.*, are figured and described. The paper concludes with brief descriptions of the following: *Buccinum strigillatum*, *taphrium*, *molinia friolei*, *strombella middendorffi*, *fragilis*, *melonis*, *chrysodomusithius*, *periscelidus*, *phœnicens*, *eucosmius*, *hypolismus*, *aerosmius*, *halibrectus*, *Trophon scitulus*, *disparilis*, *punctrella* (*galeatea* *var. ?*) *major*, *solenya johnsoni*, *calyptogena pacifica* (new genus and species of *carditidæ*), *Limopsis vaginatus*. All are West Coast forms, mostly from Alaska. We hope that illustrations

of these will follow shortly. *Trophon triangulatus* is a fine species, resembling "*Chorus*" *Belcheri*, but smaller, without the basal groove and tooth. It has probably escaped the notice of Dr. Dall that *Belcheri* is not a *chorus* at all, the type of that genus being *C. giganteus* Lesson, of Chili, a shell that looks like a big smoothish *monoceros*.—*H. A. P.*

LIST OF N. A. LAND AND FRESH-WATER SHELLS RECEIVED FROM THE U. S. DEPT. OF AGRICULTURE, WITH NOTES AND COMMENTS THEREON by ROBERT E. C. STEARNS. (Proc. U. S. Nat. Mus.) The species noticed in this paper were mainly collected in Texas, Arizona and Wyoming. *Helix humboldtiana* Val., a Mexican species, is added to our fauna, the single specimen being from Altuda, Texas, at an elevation of 5000 ft. Dr. Stearns erroneously places this in the section *Pomatia*; but it by right belongs to the *Arionta* brotherhood, in Fischer's section of *Arionta* called *Odontura*. *H. (Pomatia) aspersa*, the common European edible snail, is in the National Museum from Puebla, Mexico. The members of the Academy of Science's expedition to Mexico also found this shell very abundant around the City of Mexico, doubtless imported, as the species is an excellent traveller and successful emigrant. Dr. Stearns has been able to connect the *Bulimulus Ragsdalei* with *B. dealbatus* by intermediate examples, showing a gradual transition from the strongly ribbed to the smooth form. Under the old name *B. alternatus* are placed as synonyms, *B. schiedeanus*, *B. patriarcha*, *B. mariæ* and *B. mooreanus*. I am quite disposed to accept this arrangement of our *Bulimuli*, and would add at least two of the Mexican so-called *species* to the list of synonyms under *alternatus*. A large number of new localities are quoted for other and well-known species.—*H. A. P.*

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LIST OF SHELLS COLLECTED ON FAYAL ISLANDS, AZORES; AND ON MADEIRA ISLANDS; WITH PREFATORY NOTES.

BY WILLIAM H. RUSH, M. D., U. S. NAVY.

While serving as medical officer on board the Pennsylvania Nautical School-Ship *Saratoga* during the practice cruises of the year 1890 and the Spring of 1891, advantage was taken of the opportunities thus presented to collect any molluskan forms of animal life that by a little trouble and some searching could be found. No special outfit was provided other than the usual collecting box, with its forceps and knife, and the rake. Surface towing nets, made of the common bobinet, were used when sailing to collect the pelagic forms. Two dredges were kindly loaned by the Smithsonian Institution but no opportunity presented for their use.

During the cruises of the Summer of 1890, stops were made at Horta, Fayal Is. Azores; at Southampton, England, where no attempt at collecting was made although a few *H. (Trichia) rufescens* Pennant were taken at Netley Castle; and at Funchal, Madeira.

During the stay at Horta two trips were made to the small fresh water pond in the extinct crater in the mountains, for the purpose of procuring a supply of *Pisidium Dabneyi* De Guerne; but not a single specimen rewarded the visits. The journeys were made on the back of a small donkey, which knowing animal, as soon as the higher parts of the mountains were reached, selected the deep ruts in which to walk, often leaving the rider, unless with special attention upon his part, stranded; and the pleasures of the journey were not materially increased by the community of fleas inhabiting the hang-

ings and cushions of the saddle. To reach the edge of the crater it took four hours; the donkey with the guide, and his yelling companions, were then left to amuse themselves while the descent into the crater was made.

The crater is said to be seventeen hundred feet deep, and its sides are very steep so that the actual time of descent was quite small, but the amount of time, patience, wear and tear consumed in coming up was considerable.

At Funchal, Madeira, the ascent to the mountains was made in a vehicle upon runners and drawn by oxen over roads laid with very small paving stones and often in patterns of ornamental designs. Upon arrival at the desired elevation, the oxen were detached, allowed leisurely to make their way down, and the vehicle was pulled to one side of the road to await the time for making the return trip. That time having arrived the sledge is pulled into position, a man, holding the steering rope attached to the fore corner, stood upon each side, and then, with a shout, a push and a little confusion of the respiratory rhythm, away the whole affair goes amidst a great scattering of sparks, clouds of dust and a confusion of noises; but in an incredibly short time the trip was made that previously had taken the oxen a couple of hours to do.

List of Species Collected.

1. *Argonanta argo* L. A living specimen kindly presented by Mr. Dabney, Consul at Horta, Fayal Is.
2. *Purpura* (*Stramonita*) *hæmastoma* L.
3. *Triton nodiferus* Lam. Two living specimens.
4. *Ranella* (*Lampas*) *serobiculator* Linn. One dead.
5. *Fusus rostratus* Oliv. Dredged in 800 fms. near Graciosa Is. by the yacht *L'Hirondelle*, Duke of Monaco, kindness Mr. Dabney.
6. *Nassa* (*Hima*) *incrassata* Ström.
7. *Mitra fusca* Swainson. Is smaller but agrees in internal and external coloration with the specimen labelled *M. Adansonii* Phil., in Phila. Acad. Nat. Sciences.
8. *Olivella nivea* Gmel. Pico Is.
9. *Columbella mercatoria* Linn.
10. *Columbella* (*Nitidella*) *lævigata* Linn. Pico Is.
11. *Trivia pediculus* Linn. Pico Is.
12. *Bittium reticulatum* Da Costa. Pico Is.

13. *Littorina* (Melaraphe) *striata* King.
14. *Littorina* (Melaraphe) *cærulescens* Lam.
15. *Fossarus ambiguus* Linn.
16. *Rissoa* (Cingula) *cingulus* Mtg.
17. *Leptothyra carinata* Cantr., var. *peloritana* Cantr. 800 fms., near Graciosa Is.
18. *Monodonta sauciata* Koch. Madeira Is.
19. *Haliotis coccinea* Rve.
20. *Patella vulgata* Linn. Horta and Funchal.
21. *Patella Azorica* Linn. Horta and Funchal.
22. *Bulla striata* Brüg. Pico Is.
23. *Hyalinia* (Polita) *cellaria* Müll. Horta and Funchal.
24. *Hyalinia* (Polita) *crystallina* Müll. Horta and Funchal.
25. *Hyalinia* (Polita) *atlantica* Müll. Horta and Funchal.
26. *Helix* (Patula) *rotundata* Müll.
27. *Helix* (Acanthinula) *monas* Morelet.
28. *Helix* (Caracolina) *barbula* Charp.
29. *Helix* (Vallonia) *pulchella* Müll. Horta and Funchal.
30. *Helix* (Placentula) *fictilis* Lowe. Funchal.
31. *Helix* (Placentula) *vespertina* Morelet.
32. *Helix* (Plebecula) *nitidiuscula* Sby. In the public garden at Funchal.
33. *Helix* (Leptaxis) *undata* Lowe. Funchal.
34. *Helix* (Leptaxis) *Drouetiana* Morelet.
35. *Helix* (Leptaxis) *Azorica* Alb. Young specimens.
36. *Helix* (Pomatia) *aspersa* Müller.
37. *Helix* (Cochlicella) *ventricosa* Drap.
38. *Buliminus* (Ena) *vulgaris* Morelet.
39. *Buliminus* (Ena) *Hartungi* Morelet.
40. *Buliminus* (Ena) *delibutus* Morelet.
41. *Buliminus* sp.
42. *Cionella* (Zua) *lubricus* Müll. Horta and Funchal.
43. Pupa (*Leucochila*) *fuscidula* M. & D.
44. Pupa (*Leucochila*) *microspora* Lowe.
45. Pupa (*Leucochila*) *fasciolata* M. & D.
46. Pupa (*Leucochila*) *umbilicata* Drap. Horta and Funchal.
47. *Balea perversa* L.
48. *Pedipes afra* Gmel.
49. *Dentalium* sp. 800 fms. L'Hirondelle.
50. *Strigilla carnaria* Linn. Pico. Two odd valves.

51. *Pisidium Dabneyi* De Guerne. Kindness Mr. Dabney.

52. *Pinna rudis* L.

Where no locality is mentioned in the list, Horta, Fayal Islands, Azores, is to be understood.

NOTES ON FAMILIAR MOLLUSKS.

BY W. M. BEAUCHAMP.

It is the custom to call *Melantho rufus* Hald., a variety of *M. decisus* Say, and there are some good reasons for this. It is more than a mere color variety, however, as those familiar with its habits know very well. The shell is usually grayer and more polished without, besides the rich purple within. It requires warmer water than *M. decisus*, and in New York is restricted to favorable localities, while the other has a very wide range. Those who have taken the animal from the shell, find that it has a greater muscular adhesion, not separating readily. The young mollusks have well marked features from the very first. Thus far in New York, I have found the shell only where canal boats have been.

Some have also thought *Valvata tricarinata* and *sincera* Say, varieties of one species. There is little to suggest this in the forms or habits of these little shells. The outer appearance is very different, they have not the same haunts, nor do they eat the same food. If they are ever found together, it is in death rather than in life, as far as my experience goes.

Bythinia tentaculata Linn, has become very abundant since I first reported it many years ago. In portions of the Erie Canal it has driven out *Goniobasis livescens* and *Virginica*, merely by eating up their food. It prefers canal waters to any other, as many species do.

In the Erie Canal I collected *Pleurocera subulare* Lea, but with this I found *P. intensum* and *pallidum*, of the same author, which seem only varieties of the former. Mr. Tryon agreed with me in this. The variations are by no means as great as in *Gon. Virginica* Gmel.; in fact there seems little difference beyond the color and markings.

I have had *Margaritana margaritifera* Linn from tributaries of the Mohawk river, but nowhere west of these in New York. It is

likely to occur elsewhere, as the *Unionidae* are not the worst of travellers. I once found a number of *Anodonta Benedicti*, which had been thrown ashore by the waves on Onondaga lake, raising themselves on edge and working their way to the water. Can any one point out an invariable feature distinguishing *Unio radiatus* and *luteolus*? The distinctions do very well for some, but others seem a good deal mixed. Has not every collector some which he has not named?

Shells are not abundant in Colorado, and I took pleasure in showing the actions of *Helix Cooperi* W. G. B. to some there who had never seen a snail. This snail is abundant in Williams' Cañon, near Manitou, but I found it nowhere else, perhaps for want of time. In Cheyenne Cañon I collected some very small snails, which I unfortunately lost before identification. Conditions there are seldom favorable but something might be done by a zealous naturalist. For myself I confess that other things proved more attractive for the time. In the East, rocks are better collecting grounds, which reminds me how greatly *Helix albolabris*, on rocky islands, differs from the same shell in more fertile lands.

A NOTE ON MR. PILSBRY'S "ARTICLE IV."

BY T. D. A. COCKERELL, INSTITUTE OF JAMAICA,
KINGSTON, JAMAICA.

It is very unfortunate that so much discussion should seem necessary about *Limacella* or *Philomycus*, but I am obliged to add still a few remarks to remove what seems to be a slight misunderstanding. (1) *Limacella* Brard. My slug notes are not just now at hand, but I think I may safely assert that when *Limacella* was proposed in 1815, the *Limax* of modern authors was *not* specially provided with a name. The Linnean *Limax* included *Arion*, *Limax*, *Agriolimax* and even an *Eolis*. The first mentioned species in the Linnean *Limax* is what we now call an *Arion* (*A. ater*). Brard's first *Limacella*, I believe was *Limax maximus* of modern authors. Thus, if we were to adopt a very strict rule of priority, we might write as follows:

Limax Linn. (= *Arion* Fér.)
Limacella Brard (= *Limax* Auctt.)

As indeed was done by Dr. Jousseaume. But Linné did not specify *types* in his genera, and there are good reasons for believing that he did not regard the first mentioned species specially as the type. Accordingly, Férusac having next proposed *Arion* for another division of *Limax* L., we may adopt his name, and the residue (leaving out *Eolis*, the true affinities of which had been recognized meanwhile) namely *Agriolimax* of modern authors, remains as *Limax* L. Thus we get :

Limax L. = *Agriolimax* Mörch.

Arion Fér.

Limacella Brard = *Limax* Auctt.

I do not adopt this arrangement, because I do not consider that we can recognize Brard's name, but this is the logical result if *Limacella* Brard be adopted.

(2). *Philomycus* (or *Limacella*) *nebulosus*. It is hardly fair to say that I give no characters for this, as I expressly state that it is the *T. carolinensis* of Binney, the anatomy, jaw, and other characters of which are well described in the *Terr. Moll. U. S.* I believe still that it is distinct from true *carolinensis*, but I rejoice that Mr. Pilsbry is going to make a more careful study of these slugs, and if he finds after examining ample material that I was mistaken, nobody will more readily accept the fact than myself.

MOLLUSKS OF SAN FRANCISCO COUNTY.

BY WILLIARD M. WOOD, OF SAN FRANCISCO, CAL., AND WM. T.
RAYMOND, OF OAKLAND, CAL.

The following species have been collected by ourselves, with the exception of *Alexia myosotis*, *Limnæa nuttalliana*, *obrussa*, *Physa diaphana*, *Planorbis ammon* and *Ancylus fragilis*, which are given on the excellent authority of Dr. Cooper and others. While the list is undoubtedly incomplete, we believe it indicates fairly well the molluscan fauna of this County. There is no evidence that *Cantharus gemmatus* and *Scala grænlandica* have been found living here. Their occurrence on our beaches is probably accidental.

PELECYPODA.

- Ostrea lurida* Cpr.
Placunanomia macroschisma Desh.
Pecten hastatus Sby. (valves).
Hinnites giganteus Gray (valves).
Mytilus edulis Linn.
Mytilus edulis Linn., var. *glomeratus* Gld.
Mytilus Californianus Conr.
Adula styliua Cpr.
Anodonta Oregonensis Lea (*Nuttalliana* Lea).
Kellia Laperousii Desh.
Cardium corbis Mart.
Psidium occidentale Newc. (*abditum* Hald.)
Tapes staminea Conr.
Tapes staminea, var. *diversa* Sby.
Tapes staminea, var. *runderata* Desh.
Tapes tenerrima Cpr.
Petricola carditoides Conr.
Tellina Bodegensis Hds. (valves).
Saxidomus aratus Gld.
Macoma nasuta Conr.
Matoma inquinata Conr.
Macoma inconspicua B. & S. (valves).
Angulus modestus Cpr. (valves).
Angulus salmonea Cpr. (valves).
Schizothærus Nuttallii Conr.
Standella Californica Conr. (valves).
Lyonsia Californica Conr.
Lyonsia (*Entodesma*) *saxicola* Baird.
Cryptomya Californica Conr.
Mya arenaria Linn. (introduced).
Saxicava arctica Linn. (? *pholadis* L.)
Siliqua patula Dixon.
Pholadidea penita Conr.
Pholadidea penita var. *parva* Tryon.
Zirphæa crispata Linn. (valves).
Xylotrya setacea Tryon (*pennatifera* Blv.)

GASTROPODA.

A. pulmonata.

Selenites Vancouverensis Lea.

Limax campestris L. var. occidentalis Cooper.

Limax campestris L. var. zonatipes Ckll. (MS) new variety.

Limax Hewstoni Cooper.

Zonites cellarius Müll. (introduced).

Ariolimax Californicus Cooper.

Punctum conspectum Bland.

Helix Californiensis Lea.

Var. Nickliniana Lea, (also albino form).

Helix arrosa Gld. (Common in Marin county).

Helix armigerus Ancey.

Helix loricata Gld.

Pupa Californica Rowell.

Succinea Oregonensis Lea.

Alexia myosotis Drap. (introduced).

Limnæa palustris Müll.

Limnæa palustris var. proxima Lea.

Limnæa palustris var. Nuttalliana L.

Limnæa palustris var. Rowellii Tryon.

Limnæa palustris var. umbrosa Say.

Limnæa palustris var. Traskii Tryon.

Limnæa Adelinae Tryon.

Limnæa humilis Say.

Limnæa humilis var. ferruginea Hald.

Limnæa obrussa Say (desidiosa Say).

Limnæa bombycina Lunge (introduced).

Physa Gabbi Tryon.

Physa Gabbi var. D'Orbignyana Lea.

Physa Gabbi var. Traskii Lea.

Physa diaphana Tryon.

Physa virginea Gld.

Planorbis tumens Cpr.

Planorbis ammon Gld.

Planorbis opercularis Gld.

Planorbis vermicularis Gld.

Ancylus fragilis Tryon.

B. Ctenobranchiata.

- Pleurotoma Carpenteriana* Gabb. (fragment).
Olivella biplicata Sby. (dead).
Cantharus gemmatus Rve. (one only dead).
Nassa fossata Gld.
Nassa mendica Gld.
Columbella (*Amycla*) *carinata* Hds.
Columbella (*Amycla*) *carinata*, var. *gausipata* Gld.
Ocenebra lurida Midd.
Ocenebra interfossa Cpr.
Cerostoma foliatum Gmel.
Purpura saxicola Val.
Purpura saxicola, var. *ostrina* Gld.
Purpura saxicola, var. *emarginata* Desh.
Purpura lima Mart. (*canaliculata* Desh.)
Purpura crispata Chem., var. *septentrionalis* Rve.
Monoceros engonatum Conr.
Scala crebricostata Cpr.
Scala grœnlandica Perry. (one only, dead).
Odostomia grvida Gld.
Litorina planaxis Nutt.
Litorina scutulata Gld.
Lacuna porrecta Cpr.
Lacuna unifasciata Cpr.
Pomatiopsis intermedia Tryon.
Assimineæ Californica Cooper.
Crepidula navicelloides Nutt.
Lunatia Lewisii Gld. (dead).
Acmæa mitra Esch.
Acmæa pelta Esch.
Acmæa persona Esch.
Acmæa persona, var. *umbonata* Nutt.
Acmæa testudinalis L., var. *patina* Esch.
Acmæa testudinalis var. *scutum* Esch.
Acmæa testudinalis var. *Cumingii* Rve.
Acmæa spectrum Nutt.
Chlorostoma funebre A. Ad.
Calliostoma canaliculatum Mart. (dead).
Glyphis aspera Esch.
Fissurella volcano Rve. (dead).

POLYPLACOPHORA.

- Chætopleura Hartwegii* Cpr.
Tonicella lineata Wood.
Ischnochiton Cooperi Cpr.
Mopalia ciliata Sby.
Mopalia ciliata, sub-species *lignosa* Gld.
Mopalia ciliata, sub-species *Hindsii* Sby.
Mopalia wossnessenskii Midd.
Katherina tunicata Wood.
Nuttallina scabra Rve.
Cryptochiton stelleri Midd. (young).
-

MOLLUSKS IN THE PORTLAND, OREGON, MARKET.

BY HARRY E. DORE.

Prof. Keep's article in the January number of *THE NAUTILUS* on the Mollusks in the San Francisco market interested me very much as it was in direct line with observations and notes made by me here in Portland a little more than a year ago.

The small number of species which are usually exposed for sale is as noticeable here as it is in San Francisco though not so much to be wondered at for we are 120 miles from the ocean and further still from points where the mollusks are to be found, but I find that occasionally something out of the ordinary run is sent to the fish dealers, as for instance: about three years ago the deep sea fisheries were first attempted and the schooner "Geo. H. Chance" started outside the Columbia River Bar from Astoria for fish. Through lack of experience the nets were thrown too deep and were badly cut by the large pectens, *Amusium caurinum* Gld. allowing many of the fish to escape. In the first shipment to Portland were about two dozen large fine examples of this beauty, nearly all of which I was fortunate enough to secure at a moderate price. I have never seen it in the market since. At another time I secured one very large and perfect example of *Lunatia Lewisii* Gld. sent with bivalves to the market.

In this connection I will state that I remember when a boy and living in San Francisco that *Macoma nasuta* Conr. was commonly sold in the market; it was very abundant on the mud flats near Long

Bridge in Mission Creek at that time. It is probably not sold there now or Prof. Keep would have included it in his list.

There are practically but four species of mollusks sold commonly in the Portland fish markets:

1st. The native oyster, *Ostrea lurida* Cpr. which is so abundant on Puget Sound and Shoal Water Bay. Nearly all of the oysters sold come from either Olympia, Wash. or Oysterville, on Shoalwater Bay, Wash. The few eastern or transplanted oysters sold here are shipped from San Francisco. There are also a great many canned oysters sold here.

2d. The hard shell clam has an excellent representative in *Saxidomus squalidus* Desh., which may prove to be merely a variety of *S. nuttalli* Conr. These come from Puget Sound and are very abundant, have a large, heavy shell and can be found at all times in the fish markets. They are cheap enough to be indulged in by all, selling for one cent apiece or even less.

3d. *Tapes staminea* Conr. is also very common. The variety sent here is larger and fuller than the variety usually sold in San Francisco but not as finely sculptured.

4th. *Mya arenaria* Linn. as well as *Tapes staminea* are sent here from Shoal Water Bay, Wash. It was introduced here from the Eastern States and grows to a very large size.

By the above it would seem that Portland depends upon her neighboring state for her supply of shell fish. There is, however, a source of supply in Oregon which will become better known and its shell fish product more eagerly sought for in the near future—this is Yuquina Bay. Occasionally there are shipped to Portland a few sacks of *Ostrea lurida* and several boxes of the rock oyster, *Pholadidea penita* Conr. Newport, at the entrance to the bay, is the home of this fine piddock which attains large size and is excellent for eating.

Machæra patula Dixon and *Cardium corbis* Mart. are also occasionally offered for sale in the Portland markets; and the Chinese eat the squid which is sometimes shipped here.

The edible mussel, *Mytilus edulis* Linn. seldom finds its way so far inland; but still we seem to have our share of mollusks.

[CONTRIBUTED.]

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

SEPTEMBER 9, 1891.

Though the usual notes have not appeared for some time in the NAUTILUS, the work of the Association goes on. Judging from the correspondence received, there has been much activity among the members during the last summer and much valuable material has been collected. Quite a number of new members have been enrolled, and the new "List of Members," which will contain all their names, will be ready not later than September 30th and probably by September 20th. If there are any new names to be proposed send them to the Secretary.

Two of our members, Chas. W. Johnson, Secretary of the Association, and Wm. J. Fox, brought back with them from their Jamaica trip last spring a large amount of valuable material, collected by them in that island. Most of it has been presented to the Academy of Natural Sciences and the Wagner Institute, Philadelphia.

Prof. Benjamin Sharp, Corresponding Secretary of the Academy of Natural Sciences, was a member of the Peary Expedition to Greenland. He returned home on the 7th inst.

George T. Marston, Green Bay, Wis., recently paid a visit to Philadelphia and inspected the U. S. Collection. He expressed himself as much pleased with its progress. He has been on vacation for the benefit of his health.

President Campbell paid a flying trip to Washington in the early part of August and was the recipient of much courtesy from Professor Dall, of the Smithsonian Institute. Prof. Dall is up to his eyes in work, and is one of the busiest of our members. A painstaking, conscientious student, he does everything well and stands among the foremost of living conchologists to-day. The Government is fortunate in having such a man at the head of its conchological work.

Vice-President Ford has been summering along the New Jersey Coast and discovered several "finds" of living Naticas, Fulgurs, Solens, etc. He got tired collecting them, the specimens were so numerous. There is no man in the United States, who can clean, prepare and mount shells as beautifully as Mr. Ford. His private collection, a labor of love for more than thirty years, is one of the finest in the country.

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No. 6.

MOLLUSKS OF SPOON RIVER, ILL.

BY DR. W. S. STRODE, BERNADOTTE, ILL.

Spoon river is a tributary of the Illinois. For a hundred miles from its junction with that stream its average width is about one hundred and fifty feet. It is a clear, swift-running stream, pursuing a sinuous course through a valley a half mile wide. Its banks are fringed by willows that here and there sweep the current in rhythmical response to every passing breeze. Overshadowing this border are silver-leaved maples, elms, and intertwining undergrowth, and beyond, towering above all like gigantic sentinels, stand the monarchs of the forest—giant sycamores.

No systematic study of the mollusks of this river has ever been made. Prof. Jno. Wolf, an aged naturalist of Canton, Ill., has made some researches, and probably knows more of the mollusks of the Illinois and Spoon Rivers than does any other living man, but he has written little of his discoveries.

Some of the Unios found, attain a size and perfection of form rarely equalled by shells of the same species found elsewhere. This perfection is due to the fact that each species finds in the variety of deep and shallow water, swift and sluggish currents, deposits of black mud, blue clay, sand, rock, and gravel, or a mixture of all these, the environment most suitable for perfect development.

Specimens of *U. multiplicatus* have been found over eight inches in length, and weighing three pounds. *Margaritana complanata* also

grows very large, one specimen found two years ago being nine inches long.

A half a mile below the milldam at Bernadotte there is a noted mussel bed where for many years the fishermen have resorted for bait for their trout lines; here in a few minutes an ample supply of big fat mussels was to be had, and a catch of the toothsome channel cat assured. If an eel was desired the red meat of a *trigonus* was thought to be almost a sure means of luring the slippery *Anguillidae*. Here within a space of two feet square I have taken at one time such species as *Unio plicatus*, *ventricosus gibbosus*, *asperrimus*, *pustulosus*, *tuberculatus*, *anodontoides*, and *Marg. rugosa*. A little higher up in deeper water and muddier banks *U. multiplicatus*, and *Marg. complanata* were plentiful. A little lower down, where there was much sand, the *U. occidentis* and *anodontoides* could be found by tracing the path made by them in moving about. A half mile further down stream are great ledges of rocks that in places project far out over the water. This is a favorite resort for pic-nics, fishing parties, and experts at throwing the gig or fish-spear can sometimes obtain fine buffalo or catfish that are disporting under the shadows of these immense rocks.

At this picturesque point are to be found in considerable numbers, *U. trigonus*, *gracilis*, *pustulosus*, *tuberculatus*, and *lævissimus*. The latter, up to date, I have not succeeded in finding in any other location on the river.

Above the dam, where the water for a distance of five miles is from eight to fourteen feet deep, the *Ano. grandis* and the little *U. parvus* are the main shells. Here also are to be found many *Sphærium solidulum*, and *Paludina integra*. The *Physa heterostrophæ* and *Somatogyrus subglobosus* I find below in more shallow water.

On a large moss-covered rock I found at one time last fall large numbers of *Pleurocera Lewisii*, and in a few minutes gathered an oyster-can full. Visiting the locality again a few days later not one could I find, nor could I again locate them during the season.

The pearl craze struck this village last fall and wagon loads of the larger species were carried ashore and eagerly opened with the expectation of finding pearls that would at once enrich the possessor. The mussel bed before mentioned was almost annihilated. The final summing up showed about one hundred pearls of various sizes and colors. These were sent to Geo. F. Kunz, gem expert with Tiffany & Co., N. Y., who reported them of little or no value.

THE NAUTILUS.

I append a list of the mollusks that I have found to date.

Unio multiplicatus Lea.	Unio ventricosus Barnes.
plicatus LeS.	luteslus Lam.
anodontoides Lea.	ligamentinus Lam.
rectus Lam.	lacrymosus Lea.
gracilis Barnes.	cornutus Barnes.
alatus Say.	elegans Lea.
pustulosus Lea.	zigzag Lea.
tuberculatus Barnes.	Marg. rugosa Barnes.
metanevrus Raf.	complanata Barnes.
trigonus Lea.	Anodonta grandis Say.
coccineus Lea.	edentula Say.
fragosus Cond.	plana Lea.
verrucosus Barnes.	Paludina integra Say.
parvus Barnes.	Physa heterostrophia Say.
occidens Lea.	Somatogyrus subglobosus Say.
gibbosus Barnes.	Sphærium solidulum Prime.
laevissimus Lea.	Pleurocera lewisii Lea.
asperrimus Lea.	

LOCAL VARIATION.

BY REV. HENRY W. WINKLEY.

A good title for nature would be "Unity differentiated," and the words may be used not only of the whole, but of any part. Take as examples, the cell with its modifications, the class mollusca and its species, (an excellent comment on the variations as contributed by Mr. Chas. T. Simpson, to the February NAUTILUS and reminds the writer of a few which are noted below.)

A large continent is a grand field for the evolution of many varieties. Yet small areas often afford excellent examples of local variation. I mention a few as seen in this State.

Examples of *Fusus Islandicus* Gmel., from Eastport, Old Orchard or the Sheepscote now are before me. Specimens with about the same number of whorls vary greatly in size, being 3, 3½, and 1½ inches respectively. The color variations are also marked.

At Eastport numerous specimens of *Chiton marmoreus* Fabr. are found. In the midst of two hundred individuals distinctly marked with shades of red, one specimen was found whose color was a clear blue, a striking contrast in a species where there is much similarity.

Buccinum undatum Linn. is famous for its color variations. Its form is strikingly modified. Two specimens before me have the following characters. Length $2\frac{1}{2}$, divergence 75° , and length 4 inches, divergence 50° . They are from near Eastport and Old Orchard respectively. The deep water specimens near Old Orchard are apt to be elongated. At the northern end of Grand Manan, (near Eastport) a variety occurs which has no waves, and is thus deprived of the very characteristic which gives the name *undatum* to the species.

Purpura lapillus Lamarck, is also famous for its variation in color; black, white and orange may be found, with multitudes of mixtures. The variation in thickness is conspicuous. As a rule this may be explained by its surroundings. Individuals on the open coast, exposed to the surf, are thick shelled, and in sheltered bays a thin shell suffices. I was much puzzled last summer to find them extremely thick at a point ten miles from the sea on the Sheepscote river. The situation being most sheltered I could not account for this extra strength. There is a possible explanation in the climate. The temperature at the sea shore is very much warmer than ten miles inland. Perhaps there is a protection against the cold in this case, where the surf is certainly not responsible.

The fauna of the Sheepscote river has an unusual combination. As mentioned in a previous article, oysters are found living at a point some fifteen miles inland. There are representations of a more southern fauna a few miles nearer the sea, *Pecten tenuicostatus* Mighels & Adams is very abundant. To return to the example mentioned, *i. e.* *Purpura lapillus* and its dwelling place, we may observe another variation. The removal of a long pile from the bridge gave me a chance to examine the mollusca attached to it. *Mytilus edulis*, Linn. was conspicuous, also *Saxicava* and others. Those living in the deep water were delicate in color and texture, resembling forms found in warm water. Directly over these, between tide marks, occur specimens, as above noted, of extremely thick shells. These are but chance examples to illustrate a variation which is as great as that seen in the human race. Could we perfect our knowledge of the lower forms we could name them as

individuals as we do men, and feel that each had some marks even though slight, to distinguish him from his companions.

LIST OF SPECIES COLLECTED ON THE ISLANDS ST. THOMAS, ST.
KITTS, BARBADOS, JAMAICA, AND AT PENSACOLA, FLOR-
IDA ; WITH PREFATORY NOTES.

BY WILLIAM H. RUSH, M. D., U. S. N.

The first four months of 1891 were spent by the Pennsylvania School Ship *Saratoga* in cruising in the West Indies, the stops being at Bridgetown, Barbados; at Basseterre, St. Christopher's Island; at Charlotte-Amalia; at Kingston, Jamaica, and at Pensacola, Fla. At Bridgetown, St. Leonard's Church-yard and St. Agnes' Cemetery were the chief resorts. In the former were seen many specimens of *Bulimus oblongus*, Müll, all buried, to within a whorl or two of the apex, in the damp ground next to the vaults and under the roots of trees. They appear to be night prowlers as the sexton stated that he had often observed them walking at night, especially when moonlight. Their eggs were discovered around the roots of trees upon the surface of the ground, but none were found buried with the animal in the burrow in the earth.

In the latter cemetery were taken specimens of *Helix*, *Streptaxis*, *Stenogyra* and *Bulimulus*.

A narrow-gauge railroad crosses the island from Bridgetown to the eastern coast and advantage was taken of it to make a trip to Bathsheba Beach.

At all the other islands carriage hire was too expensive and the time at my disposal too short for any extended trip, so footing it was resorted to as the only way to reach reasonably near hunting grounds. In this manner the deep gorges up in the mountains of St. Kitts, at an elevation of one or two thousand feet, were visited, and the delightful view from that elevation, the cool continuous trade wind, and the beautiful forms of vegetation almost caused the object of the journey to be forgotten. However, many specimens of *Bulimulus*, *Helicina*, *Helix* and *Amphibulima* were taken.

On Jamaica, Long Mt. and Rockfort, both near Kingston, were visited at the suggestion of Mr. Henry Vendryes. At Mona House,

Long Mt., thousands of dead specimens of the genera *Helix*, *Cylin-drella*, *Cyclotus*, *Choanopoma*, etc. were observed, but only a few living *Lucidella aureola* Fér., were found. At Rockfort *Orthalicus undatus* Beck were seen æstivating and a supply obtained, each *epiphragm* being carefully preserved.

At Pensacola two cemeteries were visited. In the older one *Helix* (*Dadalocheila*) *pustula* Fér., were tolerably abundant, and a few *Hygulinia*. In the newer one *Helix* (*Mesodon*) *jejunus* Say, var. *Mobiliana* Lea, were seen in great numbers. As the soil is very sandy and as it had rained the night before, each shell was covered with a small heap of sand. They were found on the head and foot stones and on posts. They had crawled up from one to two feet from the ground.

The following are the lists for the regions visited :

West Indian Islands.

Where no locality is mentioned it is to be understood that the specimens were found equally abundant at Barbados, St. Kitts and St. Thomas. No marine forms were collected at Kingston, Jamaica.

1. *Hyalæa limbata* D'Orb. Surface N. Atlantic Ocean.
2. *Hyalæa gibbosa* Rang. Surface N. Atlantic Ocean.
3. *Cleodora pyramidata* D'Orb. Surface N. Atlantic Ocean.
4. *Styliola subula* Quoy and Gaimard. Surface N. Atlantic Ocean.
5. *Styliola*, (*Hyalocylix*) *striata* Rang. Surface N. Atlantic Ocean.
6. *Cuvieria columella* Rang. Surface N. Atlantic Ocean.
7. *Murex* (*Chicoreus*) *brevifrons* Lam. St. Thomas.
8. *Murex* (*Chicoreus*) *pomum* Gmel. St. Thomas.
9. *Purpura patula* Linn.
10. *Purpura hæmastoma* Linn.
11. *Purpura undato* Lam.
12. *Purpura deltoidea* Lam.
13. *Ricinula* (*Sistrum*) *nodulosa* Ad. St. Thomas.
14. *Triton nobilis* Conrad. Purchased at St. Thomas.
15. *Triton* (*Simpulum*) *pilearis* Linn. St. Thomas.
16. *Fasciolaria tulipa* Linn.
17. *Fasciolaria distans* Lam.
18. *Leucozonia cingulifera* Lam. Bathsheba.
19. *Cantharus Coromandelianus* Lam. Bathsheba.

20. *Phos Guadeloupensis* Petit. St. Thomas.
21. *Nassa, vibex* Say. St. Thomas.
22. *Mitra Barbadosis* Gmelin. St. Thomas.
23. *Olivella* sp. St. Thomas.
24. *Columbella mercatoria* Linn. St. Thomas.
25. *Columbella* (*Nitidella*) *lævigata* Linn.
26. *Columbella* (*Nitidella*) *cribaria* Lam. St. Kitts.
27. *Columbella* sp. Barbados.
28. *Conus mus* Hwass. Barbados.
29. *Pleurotoma* (*Drillia*) *fuscescens* Gray. Barbados. Semi-fossil.
30. *Strombus pugilus* Linn. Purchased at St. Thomas.
31. *Strombus gallus* Linn. Purchased at Barbados.
32. *Cassis flammea* Linn. Purchased at Barbados.
33. *Cypræassis testiculus* Linn. Barbados.
34. *Vermetus varians* D'Orb. St. Thomas.
35. *Eulima Jamaicensis* C. B. Ad. St. Thomas.
36. *Littorina nodulosus* Gmel.
37. *Littorina muricatus* Linn.
38. *Littorina ziczac* Chem.
39. *Littorina meleagus* Beck. St. Thomas.
40. *Littorina* sp. Barbados.
41. *Modulus lenticularis* Chem. St. Thomas.
42. *Planaxis lineatus* Da Costa.
43. *Planaxis nucleus* Lam.
44. *Litiopa bombyx* Rang. On gulf-weed, N. Atlantic Ocean.
45. *Cerithium* (*Lampanella*) *minus* Gmel.
46. *Cerithium* (*Lampanella*) *minus vas se temstriatum* Say.
47. *Cerithium* (*Lampanella*) *atratum* Born. St. Thomas.
48. *Rissoina* (*Schwartziella*) *Chesnelii* Mich. St. Thomas.
49. *Rissoina* sp. St. Thomas.
50. *Choanopoma interruptum* Lam. Two dead and badly weather-worn specimens, Long Mt.
51. *Tudora fecunda* Ad. All dead, from Long Mt.
52. *Cyclotus Jamaicensis* Ch. All dead, from Long Mt.
53. *Helicina* sp. St. Kitts.
54. *Helicina Antillarum* Sby. St. Kitts.
55. *Helicina induta* Shuttl. St. Thomas.
56. *Helicina convexa* Pfr. Bridgetown.
57. *Lucidella aureola* Fér. Long Mt.
58. *Nerita fulgurans* Gmel.

59. *Nerita tessellata* Gmel.
60. *Nerita peloronta* Linn.
61. *Nerita versicolor* Gmel.
62. *Neritina virginea* Linn. St. Thomas.
63. *Phasianella* (*Tricolia*) *umbilicata* D'Orb. St. Thomas.
64. *Astralium* (*Lithpoma*) *tuber* Linn.
65. *Astralium brevispina* Lam. St. Thomas.
66. *Livona pica* Linn.
67. *Chlorostoma maculostriatum* C. B. Ad. St. Thomas.
68. *Chlorostoma scalare* Anton. St. Kitts.
69. *Chlorostoma fasciatum* Born. St. Kitts.
70. *Chlorostoma excavatum* Lam.
71. *Chlorostoma* sp. St. Kitts.
72. *Fissurella* (*Cremides*) *nimbosa* Linn.
73. *Fissurella* (*Cremides*) *nodosa* Bom.
74. *Fissurella* (*Cremides*) *barbadensis* Gmel.
75. *Glyphis listeri* d'Orb. St. Thomas.
76. *Glyphis alternata* Say.
77. *Submarginula octoradiata* Gmel. St. Thomas.
78. *Acmæa cubensis* Rve. Barbados.
79. *Acmæa candeana* d'orb. St. Kitts.
80. *Acmæa punctulata* Lam. St. Thomas.
81. *Lepidopleurus pectinatus* Say. Barbados.
82. *Lepidopleurus productus* Rve. St. Thomas.
83. *Lophyrus marmoratus* Chem.
84. *Lophyrus squamosus* Linn. and vars.
85. *Lophyrus fasciatus* Wood.
86. *Lophyrus assimilis* Rve.
87. *Lophyrus* ? *viridis* Spengl. St. Thomas.
88. *Acanthopleura piceus* Gmel.
89. *Atlanta peronü* Les. Surface N. A. Ocean.
90. *Oxygyrus keraudrenü* Rang. Surface N. A. Ocean.
91. *Bulla striata* Brug. St. Thomas.
92. *Aplysia* sp. St. Thomas.
93. *Aplysia* sp. St. Thomas.
94. *Streptaxis deformis* Fér. Bridgetown.
95. *Hyalinia incisa* Pfr. St. Kitts.
96. *Hyalinia indentatus* Say. Pensacola, Fla.
97. *Helix* (*Microphysa*) *vertex* Pfr. St. Thomas.
98. *Helix* (*Microphysa*) *subaquila* Shuttl. Barbados.

99. *Helix* (*Microphysa*) *sincera* ad. Long Mt.
100. *Helix* (*Microphysa*) *perdepressa* ad. Long Mt.
101. *Helix* (*Sagda*) *jayana* rd. Long Mt.
102. *Helix* (*Dædalochila*) *pustula* Fer. Pensacola, Fla.
103. *Helix* (*Mesodon*) *jejuna* Say var. *Mobiliana* Lea. Pensacola.
104. *Helix* (*Dorcasia*) *similaris* Fer. Bridgetown.
105. *Helix* (*Lucerna*) *sinuata* Müll. Long Mt. dead spec.
106. *Helix* (*Lucerna*) *acuta* Lam. var. *lamarckii* Fer. Long Mt.
107. *Bulimus oblongus* Müll. Barbados.
108. *Bulimulus multifasciatus* Lam. St. Kitts.
109. *Bulimulus exiles* Gmel.
110. *Amphibulima patula* Brug. St. Kitts.
111. *Orthalicus undatus* Brug. Rockfort, Jam.
112. *Orthalicus zebra* Müll. Bridgetown.
113. *Stenogyra beckiana* Pfr. Bridgetown.
114. *Stenogyra octona* Ad.
115. *Stenogyra subula* Pfr. Long Mt.
116. *Stenogyra octonoides* Ad. Bridgetown.
117. *Stenogyra læviusculus* Ad. Jamaica.
118. *Cylindrella brevis* Pfr. Long Mt.
119. *Cylindrella minuda* Ad. Long Mt.
120. *Succinea augustior* Ad. Rockfort.
121. *Succinea barbadensis* Pfr. Bridgetown.
122. *Succinea approximans* Shuttl. St. Thomas.
123. *Succinea* sp. St. Kitts.
124. *Melampus pusillus*? Gmel. St. Kitts.
125. *Pedipes mirabilis* Muhl. Bathsheba and St. Kitts.
126. *Physa jamaicensis* Ad. St. Thomas.
127. *Macoma constricta* Burg. St. Kitts.
128. *Sanguinolaria sanguinolenta* Gmel. St. Kitts.
129. *Donax denticulatus* Linn. St. Kitts.
130. *Venus cancellata* Chem. St. Thomas.
131. *Venus granulata* Gmel. St. Thomas.
132. *Chama lazarus* Linn. St. Thomas.
133. *Lucina trigerina* L.
134. *Arca gradata* Brod.
135. *Arca noæ* D'Orb. St. Thomas.
136. *Arca fusca* Brug. Yg. of St. Thomas.
137. *Arca barbata* Linn. Yg. of St. Kitts.
138. *Mytilus exustus* Linn.

139. *Perna alatus* Gmel.
 140. *Lima scabra* Born. St. Kitts.
 141. *Semele decussata* Gray. St. Thomas.
 142. *Semele orbiculata* Say. St. Thomas.

SYNOPSIS OF THE PRINCIPAL VARIETIES OF *AGRIOLIMAX*
AGRESTIS (L.)

BY T. D. A. COCKERELL.

As this species is now quite extensively naturalized in America, and varies considerable, it is of interest to ascertain what varieties exist on this continent, and whether they are identical with those of Europe. The following table has been prepared as a guide to the identification of the more usual forms. In some cases varietal names have been interpreted rather more widely than used by their original authors, but a certain amount of modification must be allowed under varietal groupings, just as examples of a species must be admitted to diverge from the original type.

A. *Without Spots.*

- | | | | | | | |
|---|---|---|---|---|---|-------------------------------|
| (1) Ashy or pale ochreous | - | - | - | - | - | <i>*typicus</i> Less & Poll. |
| (2) Reddish-ochre | - | - | - | - | - | <i>rufescens</i> Less & Poll. |
| (3) Reddish-ochre above, white beneath | - | - | - | - | - | <i>*succineus</i> Westerlund. |
| (4) Yellowish-amber, tentacles bluish-brown | - | - | - | - | - | <i>xanthosoma</i> Fischer. |
| (5) Purplish or lilac-brown | - | - | - | - | - | <i>lilacinus</i> Moq. |
| (6) Grey, rather dark | - | - | - | - | - | <i>- griseus</i> Ckll. |
| (7) Greyish-white, mantle darker | - | - | - | - | - | <i>cineraceus</i> Moq. |
| (8) Whitish or nearly white | - | - | - | - | - | <i>*albidus</i> Picard. |
| (9) Albino | - | - | - | - | - | <i>- albus</i> Ckll. |
| (10) Very dark brown | - | - | - | - | - | <i>- tristis</i> Moq. |
| (11) Black | - | - | - | - | - | <i>niger</i> Butterell. |

B. *Spotted or blotched.*

- | | | | | |
|---|---|---|-------------------------------------|--------------------------|
| (12) With numerous black or blackish points | - | - | - | <i>punctatus</i> Picard. |
| (13) With grey or blackish mottling | - | - | <i>*sylvaticus</i> Moq. (non Drap.) | |
| (14) Often reddish; spots blackish, inclining to reticulation on body | - | - | <i>*reticulatus</i> Moq. | |
| (15) Grey, with black spots or mottling, tentacles fuscous | - | - | <i>*varians</i> Westerlund. | |
| (16) Grey, with black markings tending to coalesce, tentacles dark | - | - | <i>nigricans</i> Westerlund. | |
| (17) Reddish-ochre, with obscure brownish mottling or brown spots. | - | - | <i>*obscurus</i> Moq. | |

The varieties marked with an asterisk have been found in America. I have seen no American varieties that differ at all from those of Europe. Vars. *sylvaticus*, *varians* and *succineus* were sent to me by Mr. H. F. Wickham, who collected them at Portland, Oregon. This is, I believe, the first record of the species from the Pacific coast, but Mr. W. G. Binney informs me that he has *L. agrestis* from San Francisco.

NOTES AND EXCHANGES.

WESTERN RANGE OF BYTHINIA TENTACULATA.—This introduced European species is rapidly spreading in America, having already invaded a large part of Canada and New York. It has recently been found by Wm. H. DeCamp, M. D., in Black Lake, Ottawa Co., Michigan. Dr. DeCamp has deposited specimens in the collection of the American Association of Conchologists.

HELIX ASPERSA IN CALIFORNIA.—Apropos of the remarks in the August Nautilus on Prof. R. E. Stearns' "List," recording this snail from Puebla, Mexico, reminds me that I have some fine specimens of *Helix* (*Pomatia*) *aspersa*, collected in a garden in the city of San Jose, Santa Clara County, California, some twelve years ago; they were doubtless introduced by some of the European residents of that place. Lorenzo G. Yates, Santa Barbara, Cal., Sept. 1891.

EXCHANGE.—What am I offered in exchange for a collection of California Land, Fresh-water and Marine shells containing 65 species and numbering 130 specimens? Have plenty of duplicate sets of the above collection. Address, Williard M. Wood, C. C., 2817 Clay Street, San Francisco, Cal.

DR. GEORGE HEWSTON

DIED SEPT. 4, 1891.

Dr. George Hewston, well-known to most American conchologists for his great interest in shells, died Sept. 4, at his residence, 1132 Sutter street, San Francisco, California, from Bright's disease of the kidneys. He was born at Philadelphia on Sept. 11, 1826,

graduated from the University of Pennsylvania, and for a short period was demonstrator of anatomy in the Philadelphia College of Medicine. Dr. Hewston removed to San Francisco in 1860 and has practiced medicine there ever since. In addition he served one term as a member of the Board of Supervisors and at the time of his death was second Vice-President of the Academy of Sciences and Past Grand Master of Apollo Lodge, Independent Order of Odd Fellows. Dr. Hewston was for many years an enthusiastic collector and student of shells. Several species discovered by him bear his name. Dr. Hewston leaves a widow, two sons and daughter, as well as a large circle of friends and correspondents to mourn his loss.

NEW PUBLICATIONS.

BIBLIOGRAPHY OF THE GEOLOGY OF MISSOURI. By F. A. Sampson. Published by the Geological Survey of Missouri. Mr. Sampson has given to the compilation of this bibliography the labor of several years. The result, an 8vo. of 178 pages, leaves little to be desired, and will be found indispensable to the student of the geology or paleontology of Missouri. Under each title, a brief résumé of the contents, or list of species described in each publication, is given. The amount of investigation and labor required for the production of such a volume can be appreciated only by those who have attempted similar projects. Mr. Sampson is to be congratulated upon the completion of his work—*H. A. P.*

LIST OF SHELLS COLLECTED ON THE WEST COAST OF SOUTH AMERICA, etc. (From Proc. U. S. Nat. Mus. xiv, pp. 307-335). By Robt. E. C. Stearns, Adjunct Curator, Dept. of Moll., U. S. Nat. Mus. A valuable contribution to our knowledge of the distribution of West American mollusks, with critical notes in Dr. Stearns inimitable style. A new species, *Tectarius atyphus*, from Manta, Equador, is named but not described.—*H. A. P.*

THE NAUTILUS.

VOL. V.

NOVEMBER, 1891.

No. 7

A BYSSUS IN UNIO.

BY DR. V. STERKI, NEW PHILADELPHIA, OHIO.

In the early morning of Oct. 2nd, while collecting "mussels" in the Tuscarawas river, I found a young specimen of *Unio ligamentinus* Lam., 27 mill. long, with a thread-like byssus 8 inches long, at the distal end attached to a small stone of about 8 mill. diameter. The whole thing was wound up, wrapped in a paper and put in the pocket. Several hours later, when I had time to look at it, the thread was dry, brittle, and broke, becoming detached from the stone. Thus the object was put in water with some glycerine and carbolic acid, for microscopic examination; for which I found leisure two days later.

The thread was now rather dark-brown in coloration, while, when fresh, it had shown different shades from horn color to light-brown; as far as seen in the shell—4.5 mill.—it still was colorless. Irregularly cylindric or somewhat flattened, it had a diameter varying from 0.18–0.26 mill. The distal end, where it had been attached to the stone, was flattened and split into several irregular flat filaments, while the proximal end, which now slipped out of the shell as soon as I laid hold on it with the pincers, was thickened to a short bulb of 0.42 mill. in diameter.

The inner or main part of this byssus is composed of hundreds of finest fibres, of different diameters from about 0.0015–0.007; but many of them still show more or less distinct longitudinal striation. Even at the proximal or bulb end I could not see any other formation. Outside of this cord of fibres there is a cortical layer of a

different structure; it shows a somewhat irregular, more or less oblique and waving, but in general transverse, i. e. circular striation. These undulations are almost everywhere of two different kinds; larger, averaging in width from 0.01 to 0.022 mill., and smaller, between them, about 0.004, also only 0.007 mill. In many places the two systems are not distinct, and in others the undulations are mingled with similar figures of quite irregular form and distribution. On the youngest part, that is the inner end near the bulb, there is nothing of this transverse striation, but in its place a rather thick layer of spindle cells of about 0.006 mill. diameter, more or less transversely arranged, which become the longer and narrower as they are farther from the bulb, and it is evident that the circular striation is derived from these cells. Some acetic acid added brought to appearance the endoplasts (nuclei) in some of the cells, but not very distinctly; probably the object was not fresh enough.

It is to be expected that more such specimens will be found, also of other species of *Unionidae*; for *U. ligamentinus* is hardly the only one to have a byssus long after the embryonic stage. And some points, in which my examination was not sufficient, may then be better ascertained.

CRITICAL NOTES ON EASTERN TEXAS UNIONIDÆ.

BY H. A. PILSBRY.

A collection of *Uniones* lately obtained by the writer from Mr. W. L. McDaniel of Tyler, Texas, has given new localities for a number of species, as well as occasion for notes on their synonyms and relationships.

The species of the southern Mississippi River, described originally from Louisiana, Mississippi and Arkansas, will mostly be found in eastern Texas, and constitute nearly the entire naiad fauna of that region. There are besides these, a few forms common to the whole Mississippi drainage, and found also in the Alabama basin, and a few peculiar to Texas and Mexico, the latter becoming more and more numerous as we travel southward.

Most of the characteristically Texan species belong to Mississippi River types, a circumstance which first struck me when working up

the *Uniones* collected by myself in Texas, during two visits some years ago.

In the matter of synonyms I have mentioned only such indisputable facts as have forced themselves to my notice while identifying the specimens in hand. Far more extensive name duplication exists in many cases.

It has been obvious to me for years that Lea's system of sections founded on contour, for the classification of *Unionidæ*, is hopelessly and radically wrong. It builds up false groups in about nine cases out of ten. Lea doubtless knew this as well as we, intending his system merely to be a convenient working guide. In this case, as in most others, the natural system will supercede the artificial, as it will, when well worked up, be found vastly more convenient.

One of the main characters of the new system will be *the sculpture of the beaks*, which is greatly varied in the different types, and remarkably constant specifically. The importance of collecting *young* with old specimens cannot be too strongly impressed upon the field naturalist. The character of being winged over the hinge-ligament is of minor importance. Lea's *alate* group including a number of very diverse types.

Among the more prominent groups represented in the collection here commented on, are the group of *U. plicatus*; the group of *U. parvus* (including *parvus*, *Bealei*, *Texasensis*, *Sayi*, *camptodon*, etc., etc.); the group of *U. pustulosus*, (including *Houstonensis*, and *nodiferus* below, and a number of northern species); the group of *U. alatus* (including *purpuratus*, *alatus*, *lævissimus*, etc., etc.)

The species are as follows:

U. plicatus Les. Leon Cr., Lee Co., Texas. Common and typical at least as far south as the Colorado River at Austin.

U. trapezoides Lea. Sabine River, Shelby Co., and Neches River near Tyler, Texas. Say's name *interruptus* has priority, despite Lea's assertion to the contrary, but it had better be dropped on account of the earlier *interruptus* of Rafinesque, Conrad, *et al.*

U. perplicatus Conrad. Big Eddy in Neches River near Tyler, Texas. Apparently distinct from the numerous plicate *Uniones* of Texas, many of which are mere varieties.

U. Chunii Lea. Big Eddy in Neches River near Tyler, Texas. Belongs to the *trigonus* group, but is far less angular. It is very variable.

U. castaneus Lea. Neches River near Tyler, Texas. A compact little shell, described originally from Alabama. Specimens from "Ouichita, Kansas" are also before me. Mr. Simpson called my attention to the identity of these specimens with the Alabama species.

U. Houstonensis Lea. West Yegua Creek, Lee Co., Texas. A smooth species of the *U. pustulosus* group. It is somewhat allied to *U. petrinus* Gld., an unfigured species of which *U. Bollii* Call is a synonym.

U. nodiferus Conrad. Big Eddy in Neches River near Tyler, Texas. Lea unites this with his *Schooleraftii*, but it is apparently as distinct as most of the *pustulosus* group.

U. asper Lea. Kickapoo Creek, Henderson Co., and Neches River at Tyler, Texas. This Janus looks on one side toward *apiculatus* Say, and on the other in the direction of *lachrymosus* Lea and *fragosus* Con. Some queer episodes will sometime be revealed in the family history of the "*apiculatida*." The mingling of blood has been something scandalous.

U. tuberculatus Barnes. Neches River near Tyler, Texas. Some specimens have the tubercles arranged very distinctly in V-shaped rows, as in *Unio apiculatus* Say. In fact, *tuberculatus* belongs to this same group, despite its different contour. This shell is found throughout the Mississippi (including Ohio and Missouri) drainages, as well as in the Alabama River. Some southern specimens have the nacre pink, a character I have never observed in Northern shells.

U. Berlandierii Lea. Colorado River near Austin. This is very closely allied to *U. Tampicoensis* and *U. Tecomatensis* of Lea. Belongs to the group of *U. crassidens* Lam.

U. purpuratus Lam. Big Eddy in Neches River near Tyler, Texas. Stands between *alatus* and *coloradoensis*. Lea gives the correct synonymy.

U. Hydianus Lea. Kickapoo Creek, Henderson Co.; Neches River near Tyler, and Texarkana, Texas. An apparently distinct species of the *luteolus* type. Varies in color from black to yellow or red rayed with green. The males and females are notably dissimilar in form, as in *U. luteolus*, etc. Compare *U. approximus* Lea.

U. Bealei Lea. Near Forney, Texas. Closely allied to *U. Texasensis* Lea, but the teeth are much more compressed.

U. Texasensis Lea. Wimberly Lake, Lee Co., Texas. Allied to *U. parvus*, *U. Bealei*, etc. Lea's *U. Bairdianus* is a synonym.

U. Sayi Tappan. Texarkana, Texas. Allied to *camptodon*, but easily separable from the types of that species. *U. subcroceus* Con. seems to be the same.

U. camptodon Say. Water works reservoir, Tyler, Texas. I do not propose to go into the tremendous and involved synonymy of this member of the *U. parvus* group. Typically the *camptodon* is distinguished by the form of the hinge-line, which is decidedly curved under the beaks. Forms very similar are found from the Ohio River to East Texas and to Florida.

U. declivis Say. Sabine River, Shelby Co., Texas. More angular posteriorly than *U. symmetricus*. *U. geometricus* of Lea is a synonym, as Lea himself ascertained.

U. symmetricus Lea. A species allied to *declivis* Say, but less angular. It has much the general appearance of the common eastern *U. complanatus*. The synonymy of *symmetricus* includes *U. porrectus* Conrad, *U. manubius* Gould, and (according to Mr. Simpson) *U. Jamesianus* Lea. Mr. Simpson kindly compared specimens with the types of *symmetricus*, confirming my identification. The localities are Blackfork Creek, near Tyler, Texarkana, and West Yegua Creek, Lee Co., Texas.

U. subrostratus Say var. *Rutgersvillensis* Lea. Texarkana; Wimberly Lake, Lee Co., Texas. The extensive synonymy of this species has been worked out by Prof. R. E. Call, (Bull. Washb. Lab.)

U. anodontoides Lea. Blackfork Creek near Tyler; West Yegua Creek, Lee Co., Texas. Exhibits no variation from the common Mississippi and Ohio River types.

Anodonta Stewartiana Lea. Neches River near Tyler. Belongs to the *A. corpulenta* group. *A. virens* Lea is probably a synonym, and *H. Linnæana* Lea is closely allied.

ON THE DISTINGUISHING CHARACTERS OF UNIO RADIATUS AND UNIO LUTEOLUS.

BY GEO. W. DEAN, KENT, OHIO.

In the September NAUTILUS, Rev. W. M. Beauchamp has the following queries: "Can any one point out an invariable feature

distinguishing *Unio radiatus* and *luteolus*? The distinctions do very well for some, but to others they seem a good deal mixed. Has not every collector some which he has not named?"

After long familiarity with *luteolus* in many streams and reservoirs and having several suites of *radiatus* from different localities, and seeing it plentiful in the Susquehanna River at Muncy, Pa., the thought has not come to me that they were even closely related; nor do I think they are. Sometimes there is an *indescribable* something plainly discernible to the eye of an expert that separates species, but there is no such difficult or intangible distinction in this case and I think I can make the distinctions plain to Mr. Beauchamp.

I can emphatically say that I have nothing at all like either species that is not easily named.

As a first distinction I give the *form of the female of luteolus* which at maturity becomes very broad and inflated at the posterior end and truncated, while forward it remains narrow and very small, comparatively. This characteristic I have not seen in *radiatus* and do not think it exists. The difference between the male and female is so great in *luteolus* that Anthony thought them distinct and gave to the male the name of *U. distans*.

Another and very marked difference is in the epidermis. In *luteolus* it is, in its perfect state, polished and hard as glass, giving to the radiating stripes a distinctness rarely seen in the genus. While the lines of growth in *radiatus* are very much larger, giving the surface to the naked eye more the appearance of velvet or fine plush also giving to the radiating stripes a corresponding dimness. Of course these distinctions in the epidermis come out only in cleaned shells or young specimens naturally clean; they would not be noticed in mature shells as taken from the water. But even in this state I should readily distinguish either species as it came to the light. If there is such a thing as an intermediate specimen, I should like to see it and would agree to put it in the right place at sight.

As a third distinction, the range of color in the nacre of *radiatus* is very great, whilst in *luteolus*, as far as I have seen, it is uniformly light-blue. I have heard of *luteolus* with pink nacre but have never seen one. I do not know either whether these two species are ever found together.

A NEW JAPANESE LIMPET.

BY H. A. PILSBRY.

In the pages of the NAUTILUS some months ago, the writer described a new species of *Patella* collected in Japan by Mr. Frederick Stearns of Detroit, Mich. It was with great surprise that still another large and apparently undescribed species was received, in a recent sending from the same source.

The new species, which it is proposed to call *PATELLA BONINENSIS*, was seen and purchased by Mr. Stearns at the Third National Exhibition at Tokyo, in 1890. It belongs to the subgenus *Helcioniscus*, as far as shell-characters enable one to judge.

The shell is large (90-100 mm. in length, 40 in alt.), solid, erectly conical, of a somewhat soiled buff color. It is sculptured with from 48-53 riblets, which vary from crenulated to markedly tubercular. The interior has a snow-white muscle-scar, surrounded by a broad brown zone, outside of which there is a silvery zone of equal width, the extreme edge being narrowly bordered with brownish or yellow. The central callus is creamy with a dark border of umber-brown. From each of the lateral angles of the "head-piece" of the central spatula, diverges a brown streak.

The nearest ally of this species is apparently the *Patella nigri-squamata* of Reeve's *Conchologia Iconica*, vol. 8, pl. 2, figs. 3a, 3b, a species reported by Reeve from Australia, but of which I have specimens from the Province of Concepcion, Chili. Reeve's species differs in having the central spatula of the interior constantly much smaller, having no diverging streaks, etc.

The Japanese know this species as *Yome-gaisara* or "Bride-cup shell."

The species of *Patella* now known from Japan may be tabulated as follows:

Shell more or less silvery or iridescent inside (Helcioniscus.)

Conical, having about 50 strong, close, elevated riblets, alternating or subequal [in size.

Large, light buff; border of the inside narrow, yellowish, *P. Boninensis* Pils.

Variegated with brown; border of the inside conspicuously black-blotched,

P. Stearnsii Pils.

Conical, having several smaller riblets in each interval between the larger ribs,

P. pallida Gld.

Ribs fine or obsolete.

Solid, with radiating dark lines; spatula brown or orange; ribs obsolete,

P. nigrolineata Rve.

- Thin, with very finely beaded riblets or striæ, *P. amussitata* Rve.
 Thin, with very fine striæ, not beaded, *P. toreuma* Rve.
Shell porcellanous inside, opaque, not iridescent (Scutellastra.)
 Depressed, having strong irregular ribs, *P. stellaformis* Rve.

[COMMUNICATED.]

DONATIONS TO UNITED STATES COLLECTION.

Owing to illness in Mr. Campbell's family, he was unable for several months, to pay much attention to the United States Collection, but since September 10th, work has been fully resumed and the collection is making its usual rapid strides. It would be impossible in the limited space granted to us in the NAUTILUS to acknowledge all the shells sent since the date of the last acknowledgment, but the following will give an idea of them.

I. Greigor, Jacksonville, Fla.—

Ranella Californica, Hinds; *Oliva litterata*, Lam. and *Nassa vibex*, Say.

F. E. Blanes, Key West, Fla.—

An interesting lot of Key West Shells including *Marginella guttata*, Dillw., and *pellucida*, Pfr.; *Cypræa cinerea*, Gmel.; *Olivella nivea*, Gmel. and *floralia*, Duclos; *Natica lactea*, Guild, and *canrena*, Linn.; *Ianthina communis*, Lam.; *Nerita tessellata*, Gmel. and *versicolor*, Linn; *Glyphis listeri*, D'Orb.; *Astraliun longispinum*, Lam.; *Murex Salleanus*, Adams; *Conus verrucosus*, Hwass; *Strophia incana*, Binney; *Helix cereolus*, Mühl. and numerous others.

Prof. Josiah Keep, Mills College, Cal.—

Punctum conspectum, Bld. and *Pedicularia Californica*, Newc.

H. A. Pilsbry, Philadelphia, Pa.—

Helix Roemeri, Pfr.; *Corbula undifera*, Meek, cretaceous of Wyoming.

J. J. White, Palm Beach, Fla.—

A number of marine species from Lake Worth, Fla. including *Arca Noë*, Linn.; *Columbella mercatoria*, Linn.; *Cassis sulcosa*, Born; *Ovulum gibbosum*, Linn.; *Astraliun tuber*, Linn.; *Iphigenia Brasiliana*, Lam. and *Echinella nodulosa*, Pfr.

W. S. Teator, Upper Red Hook, N. Y.—

More than 30 species of land and fresh-water shells, including *Helix pulchella*, *monodon*, *labyrinthica*, *palliat*a and *hirsuta*; *Succinea obliqua*, *avara*, *ovalis aurea*; *Limnæa humilis*, *columella*, *palustris* and *catascopium*; *Zonites fuliginosus* and *nitidus*; *Planorbis bicarinatus* and *campanulatus*. The *Succinea obliqua* Say are magnificent specimens, the largest we have ever seen, and beautifully cleaned.

Chas. LeRoy Wheeler, Cape May, N. J.—

Purpura hæmastoma, Linn., dredged at Cape May, not known there hitherto and the largest specimens we have seen; *Venus mercenaria*, Linn.; *Modiola modiolus*, Linn.

John H. Campbell, Philadelphia, Pa.—

Pholas Pacifica, Stearns; *Unio ligamentinus*, Lam.; *Tellina Gouldii*, Cpr.

Dr. Wm. H. Rush, U. S. N., Philadelphia, Pa.—

Atlanta Peronii, Les.; *Xylotrya fimbriata*, Jeff.; *Oxygyrus Keraudrenii*, Rang; *Litiopa bombya*, Kien.; and a fine series of Pteropoda, including *Hyalæa limbata*, *tridentata*, *longirostris*, *gibbosa* and *labiosa*; *Cleodora pyramidata*, *Lessonii* and *spinifera*; *Cuvieria columella*, Rang and *Diacria trispinosa*, Les.

John Ford, Philadelphia, Pa.—

Fasciolaria gigantea, Kiener, (a real giant); *Oliva idonea*, Conr. (Miocene); *Oliva araneosa*, Lam.; *Strombus costatus*, Gmel.; *Terebratella Sayii*, Morton (cretaceous, N. J.)

Geo. T. Marston, Green Bay, Wis.—

A suite of the finest and largest *Limnæa megasoma* Say we have ever seen, (Oconto, Wis.)

Dr. J. J. Brown, Sheboygan, Wis.—

Unio Canadensis, Lake Ellen, Wis.

Joseph Willcox, Philadelphia, Pa.—

A fine lot of recent and fossil shells from Florida and Md., including the *Fulgur* described by Prof. Heilprin as *rapum*, Heilpr.; *Fulgur contrarium*, Conrad (Pliocene); *Arca plicatura*, Conrad (Pliocene); *Arca idonea*, Conrad (Miocene); *Fasciolaria scalarina*, Conrad (Pliocene); *Mitra lineolata*, Heilpr. (Pliocene); *Panopæa Americana*, Conrad (Miocene); *Panopæa Floridana*, Heilpr. (Pliocene); *Acanthopleura picea*, Gmel.; *Melampus coffeus*, Linn.; *Helix varians*, Mke.; *Cardita Floridana*, Conr.; *Perna ephippium*, Lam.; *Conus proteus*, Hwass; *Avicula alaperdicis*, Reeve.

Dr. Wm. H. De Camp, Grand Rapids, Mich.—

Goniobasis livescens, Mke. (a fine series showing varieties); *Goniobasis depygis*, *gracilior* and *brevispira*; *Planorbis bicarinatus*, Say; *Anodonta subgibbosa*, Anth.; *Physa integra*, Hald.

Henry A. Ward, Rochester, N. Y.—

Spondylus princeps (fine large, white specimen.)

John Shallcross, Philadelphia, Pa.—

Spondylus princeps (fine large, red specimen.)

Mrs. M. Burton Williamson, University, Cal.—

Melampus olivaceus, Cpr.; *Chlorostoma ligulatum*, Mke.; *Helix Traskii*, Newc.; *Scalaria Hindsii*, Cpr.; *Bittium armillatum*, Cpr. (Post-pliocene);

Margarita lirulata, Cpr. (Post-Pliocene); *Mytilus unguatus*, Linn.; *Macoma nasuta*, Conr.; *Donax flexuosus*, Gould; *Solen rosaceus*, Cpr.; *Acmaea spectrum*, Nuttall; two very interesting specimens of *Haliotis Cracherodii*, Leach, showing pink iridescent tints inside; and others.

Chas. W. Johnson, Philadelphia, Pa.—

Triton Oregonensis, Redf.; *Arca ponderosa*, Say and *Americana*, Gray; *Lithophagus appendiculata*, Linn.; *Ancylus filiosus*, Conr.; *Alexia myosotis*. Drap. and a magnificent specimen of *Turbinella regina*, Heilprin, from the Pliocene of the Caloosahatchie River, Florida.

Rev. H. W. Winkley, Saco, Maine.—

Lacuna vincta, Turton; *Nucula proxima*, Say; *Margarita helicina*, Fabr.; *Melampus lineatus*, Say; *Margaritana margaritifera*, Linn.; *Limnaea desidiosa* Say—all fine specimens.

Total to date 329 genera, 706 species, 855 trays. (Eight large display cases are already devoted to the collection.)

All of the above have been mounted and placed in the collection. Others have yet to be mounted and will be announced in future. Owing to the rapid growth of the collection, it would be well for members, wishing to contribute to the collection, to send lists in advance to the President of the Association and he will check off the species already received and thus avoid duplicating.

All shells should be addressed to John H. Campbell, care of Academy of Natural Sciences, 19th and Race Streets, Philadelphia, where he and his Philadelphia associate members assemble once a week, to superintend the naming, preparation and placing of them in the collection.

NOTES AND EXCHANGES.

AN EXCHANGE COLUMN will be opened in our next number. Subscribers wishing to exchange shells may insert their notices free, the limit of length being 40 words.

MR. C. W. JOHNSON, Business Manager of THE NAUTILUS, has been collecting fossils in the Carolinas for the past several weeks.

NOTE ON *FISSURELLA PICTA* Gmel. In looking over the plates of Martyn's beautiful book, *Universal Conchology*, (London, 1784), I noticed on plate 64 a splendid figure of the above-mentioned species, under the name *Patella personata*. All authors seem to have overlooked this figure heretofore, including myself, for I had not seen it when I called the species *picta* in the *Manual of Con-*

chology, xii, p. 144. There remains now nothing to do but to restore Martyn's name to this fine shell.—*H. A. Pilsbry*.

TESTACELLA IN PHILADELPHIA. Mr. Robert Walton has found during the summer, the European *Testacella maugei* Fér. in a green-house at Lower Roxborough, Philadelphia. From their being so numerous and the green-house an old one in which no new plants have been introduced for some years, we would infer that they have been living there for some time. The specimens brought by Mr. Walton were from very small to extra large ones.—*C. W. Johnson*.

NEW SPECIES OF SHELLS.—At the regular meeting of the Academy of Nat. Sci. of Phila., Tuesday Nov. 3, Mr. Pilsbry offered descriptions of and remarks on the following new species of West Indian land shells; *Choanopoma caymenensis*, a shell having the general form and characters of *C. newtoni* Shutt., 5 whorls remaining; sutures impressed, remotely beaded, whorls encircled by spaced, unequal spiral liræ, the longitudinal striae very close, every 8th one on the body-whorl stronger; light-yellowish, having zigzag longitudinal chestnut streaks. Umbilicus moderate, lip formed as in *C. newtoni*, except that the columellar edge is fluted. Alt. 16, diam. 9 mm., alt. of apert. 6 mm.; measured outside peristome. Caynem Is.

Helix xanthophaës, the smallest known species of *Hemitrochus*, measuring only, alt. 6½, diam. 8 mm. It is subglobose, obtusely carinated, narrowly rimate. Whorls 4. Surface shining, striatulate. Obliquely streaked with reddish-chestnut on a pale, yellowish ground, with or without a dark peripheral zone, bordered below with light. Locality Inagua. *Helix* (*Plagiptycha*) *Maynardi*, allied to *H. Brownii* Pilsbry, but not carinated, having thread-like striae, banded with chestnut above the periphery, and having numerous lighter brown bands above and below. Umbilicus nearly covered by the reflexed baso-columellar lip, which has a heavy callus within. Alt. 8, diam. 13⅔ mm. Bahamas.

PATULA COOPERI, SINISTRAL.—Mr. Leslie M. Cockerell, writing from Norwood, San Miguel Co., Colorado, informs us that he has found a sinistral specimen of the above. This is a rare malformation in America, but it occurs more frequently in *P. cooperi* than in most species, as several cases are on record.—*H. A. P.*

RECENT CHANGES IN NOMENCLATURE.—Mr. R. B. Newton, in the *Systematic list of British Oligocene and Eocene Mollusca*, London, 1891, has made a number of changes in generic nomenclature, the principal of which are as follows:

For *Pectureulus* Lam. 1799, is substituted *Axinæa* Poli, 1795.

For *Hindsia* Desh. 1858 (not of A. Ad., 1853) is substituted *Hindsiella* Stol.

For *Cyprina* Lam. 1818, is substituted *Arctica* Schum, 1817.

For *Terebellum* Lam. (not of Linn.) is substituted *Seraphs* Montf.

For *Triton* Montf. (not of Linn.) is substituted *Lampusia* Schum., 1817.

For *Pteronotus* Swains. 1840 (not Gray, 1838) is substituted *Triplex* Humph., 1797.

For *Leiosstoma* Swains. 1840 (not Lacépède, 1802) is substituted *Sycum* Bayle.

For *Lampania* Gray, 1847, is substituted *Batillaria* Bens., 1842.

For *Pomatias* Hartm. 1821 (not Studer, 1789) is substituted *Hartmannia* Newton, 1891.

For *Proserpina* Sowb. 1839 (not Hübn., 1816) is substituted *Despæna* Newton, 1891.

For *Cylichna* Loven, 1846 (not Burm., 1844) is substituted *Bulinella* Newton, 1891.

A portion of these changes may prove unnecessary, as in the case of *Proserpina*, where Mr. Newton's new name must be suppressed in favor of one of the several subgeneric names already proposed under *Proserpina*. Some others hang upon such preoccupation as *Cyprinus* for *Cyprina*, and it is still doubtful whether these should be considered equivalent as names. A further review of the work will appear later.

IN THE ADDUCTOR MUSCLES OF UNIONIDÆ.—The newly formed parts, anterior, and posterior, are easily distinguished from the older parts by their coloration, being lighter, even whitish. This is found most marked in spring and early summer when new growth is going on rapidly; but also in fall I have seen it in different species.—*Dr. V. Sterki.*

IN EUROPE, A SMALL FISH, *Rhodeus amarus*, is known to deposit her eggs, by means of a long, flexible ovipositor, through the mantle opening, in the cavity of fresh-water mussels, *Anodonta*, where they are hatched, and remain until developed sufficiently to live without protection. Is anything like this known from our continent?—By the way, we know that young *Unionidæ* attach themselves on the fins, etc. of fishes, after leaving the branchial uteri of their mothers. But observations of this kind are, probably, seldom made, and it would be of value to report on each instance observed. Malacologists living in the neighborhood of fisheries could do good work in this direction.—*Dr. V. Sterki.*

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No. 8.

ACMÆA CANDEANA VS. ACMÆA ANTILLARUM.

BY H. A. PILSBRY.

So difficult a group are the limpets that their nomenclature has been in a condition little better than chaotic from the earliest times. Years ago the West American species were studied by CARPENTER, whose genius reduced them to comparative order. It was, however, left for DALL to point out, with penetrating insight, their generic relationships.

The species of the Gulf of Mexico have never been studied with the same facilities as those of West America. Dall, in his 'Blake' Report, enumerates the forms he had seen, with critical notes on their nomenclature; and the writer has this year given a somewhat elaborate account, founded upon the specimens in the Philadelphia Academy and the Smithsonian Institution collections.

In the case of *A. Candearia* however, the earliest publication of the species, under the name *Lottia Antillarum*, has been overlooked by all. In this case, as elsewhere, we can only find safety amid the flood of conflicting names, by taking our stand upon the solid rock of *priority*.

Sowerby's figure of *Lottia Antillarum* is an excellent and characteristic picture of this species in its finest development.

The synonymy will stand as follows:

Lottia Antillarum SOWERBY, Genera of Shells, fig. 4. (Issued before 1831.)

Lottia Antillarum SOWERBY, A Concholog. Manual, p. 59, fig. 231, 1839. (A somewhat different color-form.)

Lottia Antillarum Sowb., REEVE, Conchol. System., pl. cxxxvii, f. 4 (printed from same plate as Sowerby's *Genera*) 1842.

Patella tenera C. B. ADAMS, Proc. Bost. Soc. N. H. ii, p. 8 (1845).

Patella tenera Ad., REEVE, Conch. Icon. fig. 104.

Patella Candeara ORB., Moll. Cuba, ii, p. 199, atlas pl. 25, figs. 1-3.

Acmæa Candeara ORB., DALL, Catal. Mar. Moll. S. E. U. S., p. 159.

Acmæa Candeara ORB., PILSBRY, Manual of Conchology, xiii, p. 38, pl. 5, figs. 91-95, and pl. 42, figs. 92-95.

? *Patella* (*Acmæa*?) *elegans* PHILIPPI, Abbild. u. Beschreib. iii, p. 34, *Patella* p. 6, pl. 2, fig. 2 (1846).

? Not *P. antillarum* Sowb., PHILIPPI, Abbild. iii, *Patella* pl. 2, fig. 12.

Acmæa Antillarum is found throughout the West Indies, from the Bahamas and Southwest Florida to Tobago.

NOTES ON UNIONIDÆ.

BY CHAS. T. SIMPSON.

The November number of the NAUTILUS seems to be devoted mostly to Unios, and to me is an exceedingly interesting issue.

Lea's classification of the *Unionide* was almost wholly an artificial one, and I believe he instituted it for convenience in working, just as Linnaeus founded the artificial system of classification in botany. Both these great pioneers in science recognized the natural systems, and probably used these as makeshifts. All through the latter part of his writings, Dr. Lea acknowledged the fact that the *Unionide* were divisible into natural groups. To some capable student of the future is reserved the task of determining these groups and assigning the species to them. The accomplishment of this will be well worth a working lifetime of careful and honest study.

Mr. Geo. W. Dean claims to be able at sight, to refer to its proper species any specimen of either *Unio luteolus* or *radiatus*. I confess that this is more than I can do, and I have handled many thousands of specimens of both, collected from the entire territory inhabited by these familiar forms. The distinguishing features

given by Mr. Dean are excellent. There is generally that intangible something which is apparent to the experienced eye by which they may be separated, a difference more particularly in the texture of the epidermis than anything else; but even this difference is not always visible to my eyes, and I have handled many specimens that were so puzzling and close that I have been obliged to ask, "Where did they come from?" before I even dared to guess what they were.

Generally *luteolus* is solidier, more inflated, wider posteriorly and narrower anteriorly, as well as smoother than *radiatus*, but not always. A specimen of *radiatus* in Dr. Lea's collection from Lake Champlain, collected by Dr. Ingalls (Museum No. 85035), is very solid, and as much inflated as *U. hydianus*, is narrow before, and broad behind, and can only be distinguished from *luteolus* by the color and texture of the epidermis.

It was one of the great objects of Dr. Lea in making his collection, to get material from all the different parts of the territory through which the species were distributed, to get all the variations possible, and carefully preserve the name of the collector, and the record of the place in which they were obtained. Had he never done anything more than get together in this way this unequalled collection—requiring, as it did, the educating and training of a corps of able assistants in various parts of the world—he would have deserved the gratitude of students of conchology for all time to come.

In this collection are varieties of *radiatus* of every possible form, from a great number of localities; they vary from flattened and almost lenticular, to oval, quadrate, elongated, obovate and inflated. One of these shells from Newton Creek, N. J. (85058) which is labelled *Unio radiatus*, has a smooth yellowish epidermis, save when eroded, and I should unhesitatingly pronounce it *M. luteolus* if it had come from Ohio or Indiana.

Are *luteolus* and *radiatus* ever found together? From the following table it will be seen that although *U. luteolus* is a Mississippi drainage species, and *radiatus* belongs to the waters that flow into the Atlantic, the habitats of these species considerably overlap. This last includes only a few of the localities of specimens in the Lea collection.

Unio radiatus.

Saratoga Lake, N. Y.

Troy, N. Y.

Little Lakes, Lycoming Co., N. Y.

Unio luteolus.

Niagara Falls, N. Y.

Mohawk R., Erie, N. Y.

Genesee R., N. Y.

Genessee R., N. Y.	Cohoes Falls, Hudson R.
Ottawa, Can., Rideau Canal.	Seneca Lake, N. Y.
Montreal, Can.	Oneida Lake, N. Y.
St. Lawrence R., Thousand Isles.	Moose R., Hudson Bay.
Camden, S. C.	Lake Winnipeg.
Oguchee R., Ga.	Athabaska Lake.
Savannah R.	Great Slave Lake.
Charles Co., Indiana!	Small Lakes, Mackenzie R.
	Red River of the North.
	New Mexico.

I have collected *Unio luteolus* in Eastern Colorado, and it is in the General Collection of the National Museum from Mississippi and Texas. It probably ranges from the Arctic circle to the Gulf of Mexico, and from the Rocky Mountains east to the Atlantic, except in the southeastern states lying east of the Appalachian Chain. A small form occurs in Canada and the more northern states, which is quite solid, and has a dark, rather rough, brown epidermis, often without rays, sometimes almost black, and in form and texture is strikingly like some specimens of *U. Downiei* from Southern Ga., but has not a lurid nacre as the latter has. This was named *Unio borealis* by A. F. Gray, and differs sufficiently from the type to be considered a distinct species, but it connects insensibly through forms found in Wisconsin and Michigan with the western shells. One of these in the collection of Dr. Lea (85045) from Montreal, was referred by him to *radiatus*. Other forms of this protean species are so close to *ligamentinus* that it is almost impossible to separate them and this is true of certain specimens of *radiatus*.

ON THE USE OF THE GENERIC NAME SCUTELLINA.

BY H. A. PILSBRY.

The name *Scutellina* was proposed by Gray in 1847, to replace *Scutella* of Broderip, preoccupied by Lamarek for a genus of Echinoderms. It has apparently escaped the attention of malacologists who have written upon this small but excessively interesting group, that Agassiz, in 1841, used the name *Scutellina* for a genus of Echinoderms allied to *Scutella* Lam. This generic term is still in use, appearing in the latest publications relating to that group. It

therefore becomes necessary to substitute a new generic name for the molluscan *Scutellina*, and since the root of that word has become associated with the *Echinodermata*, a change to something totally different may be advisable. As a substitute, therefore, I offer the term PHENACOLEPAS, "a deceptive limpet."

The synonyms are as follows:

Scutella BRODERIP, P. Z. S. 1834, p. 47 (in part).

Not *Scutella* LAMARCK, An. s. Vert. iii, p. 7 (1816).

Scutellina GRAY, P. Z. S. 1847, p. 168, and of authors generally.

Not *Scutellina* AGASSIZ, Monogr. d'Echinodermes, Second Monogr. des Scutelles, p. 98 (1841).

DESTRUCTION OF ANODONTA CORPULENTA CPR. AT THOMPSON'S LAKE, ILL.

BY W. S. STRODE, M. D., BERNADOTTE, ILL.

Recently while on a collecting trip to Thompson's Lake on the Illinois River, I was greatly surprised at the immense number of dead mussels that lined the shores from one end of this body of water to the other.

A windrow of them extended a little beyond the water's edge clear around the lake a distance of not less than ten miles.

Upon going on to the lake in a boat I found that dead shells, with the animal still in them, were also floating all over its surface. There was absolutely thousands of them and it certainly amounted to extinction of a very beautiful and interesting species, the *Anodonta corpulenta* of Cooper.

The other *Anodonta*, the *suborbiculata* of Say, for which this lake is headquarters, did not seem to be affected and there were not more dead ones to be seen than in previous years.

I immediately set about to ascertain the cause of this wholesale destruction of the corpulenta.

On enquiring of Captain Schulte and other fishermen who owned the lake, they had but one theory as to the cause, and that it was the common northern bull-head catfish, *Amiurus nebulosus* L. S., that was doing the mischief.

They explained that this fish would attach his wide mouth over one end of the shell and suck until the muscular power of the mus-

sel was exhausted; the shell relax, when the juices would be withdrawn, after which the animal would die.

On further enquiry I could find no one that had ever caught Mr. Catfish in the act, and I was not altogether satisfied with this theory.

This lake, in common with the Illinois, Mississippi and nearly all of the western rivers, is at lower ebb than ever before known in the history of the country. From accounts in the daily papers there is great mortality among the fish of the Mississippi River, and immense numbers are dying as a result of this low water.

Might not this be the cause of the death of the mollusks in this lake? Is the same phenomena observed in other bodies of water? Let us hear from other points. Or, have the catfish in this lake, like an egg-sucking dog, learned a trick and are making the most of it.

ON THE BYSSUS OF UNIONIDÆ. II.

BY DR. V. STERKI.

Some time since I succeeded, not without hard work, in finding three more specimens of *Unio* with a byssus, one *U. luteolus* Lam., 15 mm. long, one *U.* (prob.) *ligamentinus*, only 9 mm. long, and *U.* ? 8 mm. Unfortunately I had not leisure to make an examination as exact as I wished; yet to my account in the last NAUTILUS I can add the following: the threads were for the most part colorless, or only slightly brownish. On the parts examined I found the cortical layer little developed. The byssus were more or less branched; on a piece of one about three inches long, I counted seven branches. Of the formation of these I can give an idea best by comparing them with a grass stalk: the branches sprung out from like leaves with short sheath, the latter with circularly arranged fibres, apparently not derived from the inner part of the "stem," but at a short distance, the branch, first flat, like a leaf, further off growing more or less cylindrical, was entirely composed of longitudinal fibres, which consequently are formed for themselves by apposition and the main thread is not split.

Later I had a chance to get some other very young mussels, among which was one only 3.5 mm. long, the smallest I have found so far,

and none of them had a byssus. Possibly it was detached while being caught and washed—with other materials—in the net.

A NEW SPECIES OF LEUCORHYNCHIA.

BY H. A. PILSBRY.

Leucorhynchia Tryoni Pilsbry.

Shell having the contour of *L. Crossei* Tryon, but larger, the umbilical tongue of callus much smaller. The margin of the umbilicus has several strong lobes or teeth. Surface smooth except the first half of the base, in front of the aperture, which shows about eight radiating grooves. Color white.

Alt. 2·8; diam. 3·8 mm.

Collected at Singapore by Dr. S. Archer.

Four specimens are before me. This group is considered by Fischer a subgenus of *Teinostoma* H. & A. Adams. *Leucorhynchia* was founded by Mr. H. Crosse in 1867, for a species from New Caledonia. In 1888, Mr. Tryon, in his monograph of *Teinostoma* described a second species as *T. (Leucorhynchia) Crossei*.

The subgenus now consists of three species which may be distinguished as follows:

Umbilical lobe of callus large; surface smooth,

Periphery carinated, *L. Caledonica* Crosse.

Periphery rounded, *L. Crossei* Tryon.

Umbilical lobe small; base radiately grooved,

Periphery rounded, *L. Tryoni* Pilsbry.

LAND SHELLS OF VANCOUVER ISLAND.

BY G. W. TAYLOR, ST. BARNABAS RECTORY, VICTORIA B. C.

1. *Selenites Vancouverensis* (Lea).
2. *Selenites sportella* (Gould).
3. *Limax agrestis* Linn.
4. *Limax hyperboreus* Westerlund.
5. *Vitrina Pfeifferi* Newcomb.
6. *Hyalina arborea* (Say).
7. *Hyalina milium* (Morse).

8. *Hyalina Binneyana* Morse.
9. *Conulus fulvus* (Müller).
10. *Pristiloma Lansingi* (Bland).
11. *Pristiloma Stearnsi* (Bland).
12. *Ariolimax Columbianus* (Gould).
13. *Prophysaon Hemphilli* Bland & Binney.
14. *Prophysaon Pacificum* Cockerell.
15. *Patula striatella* (Anthony).
16. *Patula asteriscus* (Morse).
17. *Punctum minutissimum* (Lea).
18. *Punctum conspectum* (Bland).
19. *Lysinoe fidelis* (Gray).
20. *Mesodon Columbianus* (Lea).
21. *Mesodon devius* (Gould).
22. *Stenotrema germanum* (Gould).
23. *Pupilla corpulenta* (Morse).
24. *Vertigo simplex* (Gould).
25. *Vertigo ovata* Say.
26. *Ferussacia subcylindrica* (Linn.).
27. *Succinea Nuttalliana* Lea.
28. *Succinea Oregonensis* Lea.
29. *Succinea rusticana* Gould.
30. *Onchidella Carpenteri* W. G. Binney.
31. *Onchidella borealis* Dall.
32. *Carychium exiguum* (Say)?

LIMAX AGRESTIS LINN. ON THE PACIFIC COAST.

BY G. W. TAYLOR.

In the October number of the NAUTILUS, Mr. T. D. A. Cockerell writing of *Limax agrestis*, recorded its occurrence at Portland, Oregon, and remarked that he believed this to be "the first record of the species from the Pacific Coast." However two years ago I myself noticed the introduction of the species into this part of the world, in a little paper on "The Land Shells of Vancouver Island" published in the *Ottawa Naturalist*, vol. 3, p. 84, etc. (December, 1889.)

I believe that I first observed this slug about seven years ago in the Victoria gardens, and it has since developed into a dreadful pest. There cannot I think be any doubt as to the species being an

introduced one as it has not yet been noticed in any part of Vancouver Island other than in Victoria, and the specimens resemble British ones in every respect save that the milky slime is not nearly so copious. The principal varieties occurring here are those that Mr. Cockerell would call *sylvaticus* and *varians*. I have appended to this note a list of the Terrestrial Mollusca of Vancouver Island as at present known to me. Further information concerning their occurrence may be found in my paper above referred to, a copy of which I shall forward with pleasure to any conchologist who may desire it, so long at least as my stock holds out.

GENERAL NOTES.

PUPA HOLZINGERI STERKI, IN OHIO. Three, specimens of this species occurred among other small species collected last spring at Put-in-Bay Island, Lake Erie. A comparison with specimens received from Dr. Sterki leaves no doubt in my mind as to the identification.—*Bryant Walker, Detroit, Mich.*

UNIO COMPLANATUS SOL. IN NORTHERN MICHIGAN. In the NAUTILUS for June 1889 (vol. 3, p. 16) I recorded the discovery of an isolated colony of this species at Ocqueoc Lake, in the northern part of the lower peninsula, and queried as to how it got there. Since then I have found the species in the St. Mary's river at Lime Island, Michigan. The occurrence of the species at this locality would seem to make it probable that it will be found quite generally distributed through the upper peninsula and also affords an explanation for the existence of the Ocqueoc colony.—*Bryant Walker, Detroit.*

NEW JAPANESE SHELLS. *Terebra Stearnsii*, n. sp. Shell large, much elongated, having 22 whorls remaining, the apical portion (probably $\frac{1}{2}$ the entire length) being broken off. The whorls are narrowly but distinctly shouldered just below the suture. The surface of the body-whorl is divided into three subequal parts by two spiral grooves, and below the lowest of these grooves there are several others. Base cut by about 15 unequal impressed lines; growth-striae faint. Whitish, with a single series of brown spots. Total length 105, breadth $17\frac{1}{2}$ mm.; length of aperture 12, breadth 7 mm.

Thylacodes medusæ n. sp. Shells large, generally clustered, resembling *Thylacodes polyphragma* Sassi, of the Mediterranean, but

the sculpture (consisting of spaced longitudinal cords, the intervals tri-
striate), continuous around the whole circumference of the cylinder.
Aperture circular, its diameter averaging 13 mm. For illustrations
see Proc. Acad. Nat. Sci. Phila. 1891.—*H. A. Pilsbry*.

FOOD OF LIMNÆIDÆ. Our fresh-water snails are generally believed
to be herbivorous. But they greedily feed upon animal matter when-
ever and wherever they find such; on insects, worms, mollusks (even
their own species), flesh of any kind, even when living. A *Limnæa*
palustris was seen last summer having a small leech (about 3 cm.
long and 4 mm. wide) in his mouth; he slowly drew it in and rasped,
while the victim was moving and winding about in vain efforts to
escape. This I observed for about half an hour, but had not seen
how the snail had caught the worm. Afterward the *Limnæa* held
the leech, its anterior part projecting and constantly moving, firmly
in his mouth, not rasping, now resting, now creeping about as usual,
for an hour and a half more. At that time I had to go away and
when I came back no leech was to be seen; whether it was eaten or
dropped I do not know.

When these animals are grazing on stones, glass walls in the
aquarium, on leaves, or on each other's shells, they always find a
good supply of small animals besides algæ, etc., as anyone knows
who has examined those "pastures."—*Dr. V. Sterki*.

ADDITIONAL MOLLUSKS OF SAN FRANCISCO COUNTY. Since the
list by Mr. Wm. J. Raymond and myself was published in the
September number of THE NAUTILUS, I have found five more species
as follows:

Limax agrestis Linn.

Limax maximus Linn.

Prophysaon Andersoni J. G. C. var. *marmoratus* Ckll.

Acmæa fenestrata Nutt.

Mopalia Wosnessenskii Midd. var. *Swansii*.

Making the total number found up to date, 126 species. But two
specimens of *Limax maximus* have I collected, they being apparently
young specimens.—*Williard M. Wood*.

PLANORBIS TRIVOLVIS Say, and also other related forms, has a
peculiar way of moving on or in sand; he goes "a step," as far as he
conveniently can, with the shell deep down and close to the head;
then he pushes it forward and upward, thus shoving the sand away,
and making room for another "step." It is more than probable

that this digging is done not merely for locomotion—for he could do it much easier—but in search of food.—*Dr. V. Sterki.*

SOME OBSERVATIONS on how snails move their odontophores, may be of interest, and more should be done in this direction. *Limnaeidae* feeding on glass are easily observed, if not by the naked eye, then with a good glass. In *Planorbis* the radula is narrow, and is moved from behind forward—as seen in quite a number of species. *Physa* moves its wide, expanded radula from the sides toward the middle, not forward. *Limnaea* moves it forward, but not as decidedly as *Planorbis*, and at the same time somewhat from the sides to the middle. These different ways will be found to correspond with the formation of the teeth in the different genera.—*Dr. V. Sterki.*

EXCHANGES.

MR. A. W. HANHAM will be glad to correspond with members of the American Association of Conchologists with a view to exchanging land and fresh-water shells. Address, *Bank of British North America, Quebec, Canada.*

WANTED—Zonites from any locality in exchange for British Land and Fresh-water shells.—*Robert Walton, Charles St., Lower Roxborough, Philadelphia, Pa.*

NORTHWEST LOUISIANA land and fresh-water shells for exchange. Wanted, other shells.—*T. Wayland Vaughan, Mt. Lebanon, La.*

ANODONTA SUBORBICULATA Say. I have fine specimens of this beautiful *Anodonta*, as well as many other *Unionidae* for exchange.—*W. S. Strobe, M. D., Bernadotte, Illinois.*

JAPANESE SHELLS. A large variety of Marine, Fresh-Water and Land Shells of Japan and of the Bahamas, my own collection, printed list.—To exchange for species not now in my cabinet from any part of the world; rare American *Unionidae*, *Strepomatidae* etc., desired.—*Frederick Stearns, Detroit, Michigan.*

OBITUARY.

DR. JOHN CLARKSON JAY.

Dr. John Clarkson Jay, a son of Peter Augustus Jay and grandson of Chief Justice John Jay, a distinguished member of the First

Continental Congress, died at his home, "Rye," at Rye, Westchester County, N. Y., on Sunday, being in the eighty-fourth year of his age. The immediate cause of his death was senile gangrene. Mr. Jay was graduated from Columbia College in 1827, and afterward took his diploma as M. D. Upon his marriage with Laura Prime, a daughter of Nathaniel Prime, a well-known banker, he left the practice of medicine and for a short time was engaged in the banking business, but in 1843 retired from both business and professional pursuits, to live at the country seat at Rye, on Long Island Sound, left to him by his father's will. This beautiful residence gave him full occupation, as it embraced upward of 400 acres of land.

Dr. Jay was well known in the scientific world as a specialist in Conchology, and his collection of shells was for many years the most noted in the United States. It was purchased several years ago by Miss Catharine Wolfe, and presented by her to the American Museum of Natural History.

Dr. Jay was for many years a trustee of Columbia College, was one of the early presidents of the old New York Club, and was one of the founders of the New York Yacht Club. He was a Republican in politics, and one of the early members of the Union League Club of this city. An Episcopalian, he was a moderate Churchman, strict in his own religious observances, but not in the least intolerant as to the views of others.

Dr. Jay was also actively interested in the Lyceum of Natural History (now the New York Academy of Sciences) and was its Treasurer from 1832 to 1843. At this time he was a man of twenty-five or thirty, of light complexion, open and pleasing countenance, and somewhat nervous temperament. During his more vigorous years Dr. Jay was much interested in aquatic sports and was the owner of a famous yacht called "Coquille." The valuable addition to the treasures of the Natural History Museum purchased by Miss Wolfe is now known as the Jay Collection. The shells gathered during the expedition to Japan under command of Commodore Matthew C. Perry were submitted to Dr. Jay and he wrote the article on them that appeared in the Government Reports. Dr. Jay was the author of "Catalogue of Recent Shells," which was published here in 1835; "Descriptions of New and Rare Shells," and of later editions of his Catalogue, in which he enumerated about 11,000 well-marked varieties and about 7,000 well-established species.

THE NAUTILUS.

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No. 9.

ON SOME TYPES NEW TO THE FAUNA OF THE GALAPAGOS ISLANDS.

BY WM. H. DALL.

Dr. G. Bauer has recently made some energetic and praiseworthy explorations in the Galapagos Islands, with the view of obtaining material for a discussion of the origin of their fauna. Among other things obtained was a series, small but extremely interesting, of the land shells of the various islands of the group. This collection in all probability is not exhaustive, but it seems by far more complete than any yet made at this point and a full report upon it is in preparation by the writer. Among the mollusks, which comprise a large number of races of *Bulinulus* (of the sections *Pleuropyrgus*, *Nesiotus*, *Ruphiellus*, etc.) and *Succinea* (*S. Bettii* E. A. S.) are four minute forms each of which introduces a wholly new group to the faunal list of Galapagos land shells. Preliminary descriptions of three are appended; the fourth is a *Pupa* of the usual Antillean type.

***Helicina* (*Idesa*) *nesiotica* n. s.**

Shell small, depressed, four-whorled, with periphery rounded, base moderately arched, and peristome not thickened nor reflected; epidermis of a bright reddish-chestnut, polished, but with very evident and regular incremental lines, base with a thin white callus merging into the lower lip without notch or angle; spire depressed, suture very distinct, not channelled; operculum smooth, whitish, angulated only at the upper extreme; alt. of shell 2.3, max. diam. 3.3 mm.

Found on leaves of plants on Chatham Island at an elevation of 1600 feet above the sea.

No species of this family has been reported from the Galapagos before. The type is not unknown in the Panamic region but is said to be absent from the west slope of the Andes.

Leptinaria chathamensis n. s.

Shell small, horn-colored, with a blunt apex and six rounded whorls; suture very distinct, surface polished, delicately marked with lines of growth; base rounded, widely umbilicated; aperture with the margin hardly thickened; rounded in front and at the suture; pillar broad, thin; body with a single elevated thin, sharp lamina, extending spirally inward from a point a little behind the peristome and nearly equidistant from the inner and outer lips. Alt. of shell 3.0, max. diam. 1.6 mm.

Chatham Island, on ferns at 1600–2000 feet above the sea.

Somewhat analogous forms are found in the mountains of the Panamic region.

Zonites (Hyalinia) Baueri n. s.

Shell small, horn-colored, polished, with four whorls; periphery subangular or rounded; dome of the base more elevated than that of the spire; suture distinct; surface with delicate incremental lines and finely grooved throughout by sharp but microscopic spiral striæ. Aperture rounded-lunate without sharp angles, wider than high; lip sharp, unreflected, throat unarmed; base minutely perforate; alt. of shell 1.5, max. diam. 2.2, min. diam. 1.6 mm.

South Albemarle Island on weathered bones of tortoises.

The single specimen of this very interesting form may not be quite adult, and therefore the slight tendency to angulation on the periphery may be lost in the full-grown shell. The absence of any form of *Helix* or *Zonites* has been commented on by most of those naturalists who have treated of the Galapagos shell fauna and it was certainly a most extraordinary deficiency from any point of view. This discovery of Dr. Bauer's removes the most striking anomaly of the fauna.

In addition to the above Dr. Bauer obtained specimens of an undescribed *Bulimulus* (*Pleuropyrgus*) which had also been collected by Dr. Habel on his visit to the Galapagos in 1868. Dr. Habel presented the writer with specimens on his return and these have been named in manuscript by Dr. R. E. C. Stearns *B. (Pleuro-*

pyrgus) *Habeli*. This species is distinguished from *B. (P.) Chemnitzoides* by its nearly smooth polished surface, light-brown spiral bands on a white ground and usually more slender form. It has about fifteen whorls, a blunt apex and rounded base. It measures 18.0 by 3.5 mm. It was also collected on Chatham Island by the U. S. S. Albatross on her late voyage from Norfolk to San Francisco. It does not appear among shells enumerated by Wimmer from the Habel Collection in his catalogue of the Galapagos mollusk-fauna.

A NEW SPECIES OF ZONITES FROM ARKANSAS.

BY H. A. PILSBRY.

Zonites Brittsii n. sp.

Shell *imperforate, depressed, obtusely angled at the circumference*, about equally convex above and below. Color yellowish-green, somewhat translucent, becoming light straw-yellow and opaque on the last fourth of the last whorl. Surface shining, having oblique striae under the sutures, the growth lines being quite light on the rest of the surface; base seen under a lens to be *very densely concentrically striated*. Whorls 6. Base slightly indented at the axis. Aperture slightly oblique, depressed-lunar, *the outer and basal walls lined with a heavy, opaque-white calcareous layer*.

Alt. 5, greater diam. 8.5, lesser 7.7 mill. Aperture, oblique alt. 4, width 5.6 mm.

Hot Springs, Arkansas.

This species was collected by Mr. JOHN H. BRITTS, and sent by him to the collection of the *American Association of Conchologists*, where the types may now be seen. They were submitted to the writer by the President of the Association.

The more prominent characters of this shell are its imperforate base, depressed, almost quoit-like form, the base closely concentrically striated, the shining surface, and the contrasting colors of the last whorl.

Mr. Britts sent also, specimens of the rarely found 3-toothed form of *Helix appressa* Say, from Booneville, Mo., and a number of other interesting shells.

SOME NOTES ON NORTH AMERICAN FORMS OF VALLONIA.

BY DR. V. STERKI.

According to the investigations of Dr. v. Ihering¹ this group is to be separated from *Helix* and regarded as a genus, for anatomical characters. The study of these forms seems to have been somewhat neglected in our country. These are some distinct and characteristic forms and probably more will be found. Those known to me at present are shortly pointed out in the following, in order to direct the attention of conchologists to them and have them collected wherever and whenever possible, with records of the natural features of their habits.

1. *V. pulchella* Müller, the common form of the old and new continents. Here it seems to be remarkably constant in its appearance throughout the country, while on the other hand, slightly but constantly different forms may be found in neighboring places. Besides the smooth surface it is characterized by the slowly increasing whorls, the inner ones being comparatively large, and the last not so peripheric as in most of the other forms.

2. *V. costata* Müller. The typical form seems to be not generally distributed, in North America. It deserves specific rank, beside *pulchella*, and differs from the latter not merely by the rib-striae, but by the more depressed spire, the more rapidly increasing whorls, the last one being more peripheral, so that a *costata* may be recognized, even when the ribs are wanting; generally it is also somewhat smaller; thus I found them in Europe as well as in this country. And the fact that the two forms keep distinct side by side, on both continents, is in itself a strong evidence in favor of their being different species. In some localities the one is found predominant, or exclusively, in some the other, and frequently they are found together.

3. From Illinois (Mr. Jas. H. Ferriss), Iowa (Prof. B. Shimek and Mr. Geo. W. Webster) and Kansas (Mr. Frank J. Ford) I have, in 1890 and '91, obtained a peculiar form: it is decidedly smaller (in bulk about $\frac{1}{2}$ of *pulchella*), strongly costate, the umbilicus comparatively wider than in *costata*, especially widening towards the aperture by the last whorl receding to the periphery, so that the

¹ Les Relations Naturelles des Cochlides et des Ichnopodes, Bull. Scient. 1891, p. 214.

aperture is very narrowly coherent with the penultimate whorl, and the aperture is circular, almost continuous, with a strongly thickened lip. The first whorls are remarkably small, the last grows rapidly in width and is more predominating than in the other forms. The spire is flat, but the whorls are well rounded above and the suture is very deep.

4. In a lot of minute shells, kindly sent for inspection a few days ago by Mrs. Judge Geo. Andrews, collected in damp moss on rocks at the Cliffs on Holston river, near Knoxville, Tennessee, there were a few specimens of a form nearly related to the preceding, and of the same size, yet with peculiar characters: the umbilicus is very wide, the "ribs" less strong, the last whorl comparatively narrower, widening more gradually; the peristome is continuous, somewhat "free" and the margin only slightly expanded, thin with no lip-thickening.

5. Mr. Theo D. A. Cockerell sent me two specimens of *V. cyclophorella* Ancey, from West Cliff, Colorado. They are of about the size of a typical *costata*, densely rib-striate, the spire is higher, umbilicus a trifle narrower, the whole shell more compact in its appearance. The whorls are more slowly and regularly increasing, such as it is in *pulchella*, and the peristome is only slightly "reflected;" thin without a thickened lip.

Whether, and in how far, these forms are to be regarded as distinct species, or partly rather as well marked varieties, will and can be decided only after careful comparison of much more extensive material from different parts of the country. The soft parts also will have to be examined.

NEW PHILADELPHIA, OHIO, Dec., 1891.

LIMAX AGRESTIS LINN. IN CALIFORNIA.

BY W. J. RAYMOND.

In the NAUTILUS for October and December are notes concerning the earliest recorded appearance of this slug on the Pacific Coast, from which it appears that Rev. G. W. Taylor first observed it about seven years ago in Victoria, and recorded its presence there,

¹ Containing also, *Pupa contracta*, *curvidens*, and *Vert. Bollesiana*.

in the *Ottawa Naturalist* for December, 1889. I believe that the species was brought into Oakland about the same time as into Victoria, or, perhaps, a year or two earlier; certainly in 1884-5 it had become very abundant here, in gardens. In the *Proc. Cal. Acad. Sci.*, Second Series, Vol. I, p. 13 (issued Dec. 31, 1887) Dr. J. G. Cooper published my observations on the presence of this *Limax* in Oakland, and predicted that it would become a pest to gardeners, as in fact it has done. This is the earliest published record of which I have knowledge, and the specimens, sent to Mr. Binney at that time, are probably those mentioned at the close of Mr. Cockerell's article. This slug is now gaining a foot-hold in San Francisco, for Mr. W. M. Wood has lately submitted specimens, from that city, to me, for examination, and has added the species to the San Francisco County list.

CATALOGUE OF FISSURELLIDÆ OF THE UNITED STATES.

BY H. A. PILSBRY AND C. W. JOHNSON.

A complete catalogue of the shells of the United States has long been desired by the many collectors who devote their energies especially to American mollusks, and naturally wish to know just what species are to be had. Mr. Campbell has already in these pages catalogued the *Haliotidæ*, and from time to time other groups will be taken up by various members of the American Association of Conchologists.

The *Fissurellidæ* of our area may be easily known by these peculiarities: the shell is limpet-like, and has either a perforation at or near the apex of the cone, or a slit or notch in its front edge. There are many anatomical characters also, peculiar to the family.

The group has been divided into three subfamilies, as follows:

- I. Apex of shell entirely removed by the perforation, which is bounded inside by a callus-rim which is not truncated behind. Central tooth of the radula narrow. Shell entirely external. FISSURELLINÆ.
- II. Shell as in *Fissurellinæ*, but hole larger. Central tooth of radula very broad, not narrowed above. Mantle wholly or nearly concealing the shell. FISSURELLIDINÆ.

- III. Apex of shell subspiral, not removed ; or if it be removed, the hole-callus inside is truncated or has a pit behind ; or there is a plate inside, as in *Crepidula*. Central tooth of radula wide, EMARGINULINÆ.

Subfamily I. *Fissurellinæ*.

There is only one genus, *Fissurella*.

- A. Summit of the shell near the middle ; basal margins level, not elevated at the ends, Subgenus *Fissurella*.
 a. Edge of shell not crenulated, dark-bordered inside-true, Section *Fissurella*.
 b. Edge of shell crenulated, not dark bordered inside, section, Section *Cremides*.
- B. Shell flattened, shield-shaped, the narrow hole in front of the middle ; ends of shell elevated, Subgenus *Clypidella*.

Genus 1. *FISSURELLA* Brug.

1. *F. volcano* Reeve. Santa Cruz, Cal., southward.

(Section *Cremides* H. & A. Ad.)

2. *F. barbadensis* Gmelin. Charlotte Harbor, Fla., southward.
 One of the commonest West Indian shells, easily known by its almost circular perforation.
3. *F. nodosa* Born. Florida Keys.
 The ribs are nodular, orifice oblong.

(Subgenus *CLYPIDELLA* Swains.)

4. *F. pustula* Lam. Cape Lookout, southward.
5. *F. fascicularis* Lam. Florida Keys.
 The anatomy of these is not known. Collectors should preserve specimens of the animal.

Subfamily II. *Fissurellidinæ*.

- A. Mantle entirely or nearly covering the shell ; hole large.
 a. Edges of shell nearly level, beautifully crenulated, *Lucapina*.
 b. Edges of shell elevated at each end, blunt at the sides, not crenulated, *Megatebennus*.
- B. Mantle not enveloping the shell.
 a. Perforation about central, the shape of the shell, *Lucapinella*.

Genus 2. LUCAPINA Gray, 1857.

6. *L. crenulata* Sowb. Monterey to San Diego, Cal.
 The largest and most beautiful of the American *Fissurellidæ*.
 7. *L. adspersa* Phil. Key West, Florida.
 (*Fissurellidea fasciata* Pfr. of authors.)
 8. *L. cancellata* Sowb. Tortugas.
 The edges of the hole are bluish-black.

Genus 3. MEGATEBENNUS Pilsbry, 1890.

9. *M. bimaculatus* Dall. Monterey, Baulinas Bay, Purissima and Lobitas, Cal.
 (*Clypidella bimaculata* of collectors.)

Genus 4. LUCAPINELLA Pilsbry, 1890.

10. *L. callomarginata* Cpr. Lobitas and San Diego, Cal.
 11. *L. limatula* Reeve. Key West, Florida.

Subfamily III. *Emarginulinæ*.

- A. Apex absorbed by the hole, which is bounded inside by a posteriorly-truncated callus, *Fissuridea*.
 B. Apex absorbed or remaining; anal fissure either a hole or a slit in the front margin; no hole-callus, but having a more or less developed septum back of the hole or slit.
 a. A perforation at apex or on front slope, *Puncturella*.
 C. No internal hole-callus or septum; apex not absorbed.
 a. Having a distinct slit in front, and a slit-band extending from it to apex, *Emarginula*.
 b. Having a hole on the front slope, *Rimula*.
 c. Slit short; no slit-fasciole, *Subemarginula*.

Genus 5. FISSURIDEA Swains, 1840.

This name was proposed for a highly arched species from the Philippine Is. It has hitherto been regarded as a subgenus of *Fissurella*. Its synonymy is as follows:

Fissuridea Swains., Malacol., p. 356, 1840, type *F. galeata* Helbl.
Glyphis Carpenter, P. Z. S. 1856, p. 223, type *G. aspera* Esch.
 Not *Glyphis* Agassiz, 1843, nor of Gibbs, 1848, a genus of fishes.

(Atlantic and Gulf coast species.)

12. *F. Listeri* Orb. Florida Keys.
A strongly latticed species, related to the *F. greva* of the Mediterranean Sea.
13. *F. fluviana* Dall. Florida Straits, 76-100 fms.
14. *F. alternata* Say. Chesapeake Bay, southward.
Dead specimens have been collected at Cape May, N. J. by Prof. C. LeRoy Wheeler, but the species is not found there living.
15. *F. Tanneri* Verrill. Off Delaware Bay to Hatteras, in 104-142 fms.
16. *F. minuta* Lam. Turtle Harbor, Fla.
According to Deshayes, this is not the *minuta* of Lamarck ; We believe, never-the-less that it is. If not, however, it will be called *F. granulata* Anton. It is often called by Reeve's later name, *gemmulata*.

Several other small species, allied to *minuta* will probably be found in Florida, such as *F. variegata* Sowb., *F. arcuata* Sowb., etc.

(West coast species.)

17. *F. aspera* Eschscholtz. Sitka to Monterey.
The common West Coast form.
18. *F. saturnalis* Carpenter. Santa Barbara and San Diego, Cal.
This has been known universally as "*Glyphis densicathrata* Reeve," but I am informed by Dr. Dall and Dr. Stearns that Reeve's shell is a young *F. aspera*.

(Fossil species.)

19. *F. redimicula* Say. Miocene. Yorktown and James River, Va. ; Patuxent River, Md.
Allied to *F. alternata*, but with far finer sculpture, and the hole nearly round. *F. catilliformis* Rodgers (Trans. Amer. Philos. Soc. n. ser. vi, pl. 26, f. 4, 1839) seems to be a synonym.
20. *F. alticostata* Conrad. Miocene. St. Mary's, Md. ; James river, Va. (See Foss. Sh. Med. Tert. Form. p. 28, pl. 44, f. 19.)
The type is in the Acad, N. S. Phil. coll. Typically quite distinct from *redimicula*, but transition forms collected by Mr. Johnson in Va., seem to unite the two.

21. *F. Marylandica* Conrad. Miocene. Calvert Cliff, Md.
Types in Acad. Coll. Allied to *F. tenebrosa* Con., of the Ala.
Eocene. (See Fos. Med. Tert. p. 79, pl. 45, f. 4.)
22. *F. nassula* Conrad. Miocene. St. Mary's, Md.
Type in Acad. Coll. Distinguished from the following species
by its larger size, more depressed form, etc. The riblets are
notably equal, close, and not conspicuously latticed. (See
Foss. Med. Tert. Form. p. 78, pl. 44, f. 8.)
23. *F. Griscomi* Conrad. Miocene. Stow Creek, betw. Salem and
Cumberland Cos., N. J. (See Foss. Med. Tert. Form. p. 78,
pl. 44, f. 8.)
Type in Acad. Coll.
24. *F. tenebrosa* Conrad. Eocene. Claiborne, Ala. (See Foss.
Med. Tert. Form. p. 39, pl. 14, f. 9.)
Type in Acad. Coll.
25. *F. Mississippiensis* Conrad. Eocene. (See Jour. A. N. S. P.,
2d ser., p. 113, pl. 11, f. 2.)
Allied to *F. tenebrosa* in sculpture, but the hole is quite differ-
ent. Type in Acad. Coll.
26. *F. Carolinensis* Conrad. Miocene.
A very distinct species, of which Mr. Johnson has collected
specimens on the Cape Fear River, N. C. (See Kew's Rep. Geol.
Surv. N. C. I, 1875, p. 22, pl. 4, fig. 1.)

Genus 6. PUNCTURELLA Lowe, 1827.

27. *P. noachina* Linn. Circumpolar, extending south to Cape
Fear in deep water.
28. *P. galeata* Gld. Puget Sound.
Dr. Dall has lately described a mammoth variety of this
species (var. *major*), from Bering Sea; it will probably occur
in Alaskan waters.
29. *P. Cooperi* Carpenter. Catalina Id., Cal.
30. *P. cucullata* Gld. Puget Sound to Monterey.
31. *P. circularis* Dall. Florida Strait. 539 fms.
32. *P. eritmeta* Verrill. Off Rhode Island, 1451 fms.
33. *P. erecta* Dall. Off N. Carolina, 107 fms.

Genus 7. EMARGINULA Lam., 1801.

34. *E. compressa* Cantraine. Fla. Strait in deep water.
35. *E. bella* Gabb. Monterey, Cal.
36. *E. radiata* Gabb. Eocene. California.

We have not seen this species.

37. *E. arata* Conrad. Eocene. Claiborne, Ala. (See Foss. Tert. Form. p. 44.)

A magnificent species, having some characters of *Submarginula*.

Subgenus *RIMULA* Defrance, 1827.

38. *R. frenulata* Dall. W. Fla. and Keys.

Genus 8. *SUBEMARGINULA* Blainv., 1825.

39. *S. octoradiata* Gmel. Tortugas.

40. *S. Rollandii* Fischer. S. Fla.

41. *S. emarginata* Blainv. Florida Keys.

* * *

42. *Cemoria crucubuliformis* Conrad. Miocene of Cal.

We have not been able to find this species among Conrad's types. Its generic position is of course doubtful.

43. *Cemoria oblonga* H. C. Lea. Miocene. Petersburg, Va. Type in Coll. A. N. S. P. (See Trans. Amer. Philos. Soc. 1843, p. 247, pl. 35, f. 37.)

We would consider this tiny shell a *Rimula* were it not that there is no anal fasciole extending from fissure to apex, and for the callus around the hole inside. These features cause us to believe it a very young *Fissuridea* (" *Glyphis* "), probably *F. alticostata* Conrad.

The authors will be glad to have any criticisms on this list, and also any extensions of the geographic or geologic range of the species.

GENERAL NOTES.

FOOD OF SNAILS. Have kept since last May a dozen *Helix albolabris* in confinement. Have fed them 53 species of plants of which number they have refused to eat but five species, as follows: *Achillea millefolium* L., *Brunella vulgaris* L., *Vernonia nove boracensis* Willd., *Xanthium Canadense* Will. and a species of *Euphorbia*. They generally prefer the tenderest plants but refuse some that are tender and eat of others that are hard and stringy. They refuse the stalk and leaves of young growing maize but dig down and eat the germinating kernels. I kept them in a box with soil in the bottom and wire on the top. The corn was planted in the soil and grew to

the height of three or four inches. I shall continue these experiments next summer.—*Dr. G. D. Lind, St. Louis, Mo.*

MR. ELLWOOD PLEAS, of Dunreith, Indiana, has returned from a very successful collecting trip in Alabama. He secured about 100 species of marine shells from the Gulf, nearly 20 species of land shells, about 30 Streptomatidae and 50 Unionidae. About 250 species of fossils were collected, many very large and choice specimens among them.

EXCHANGES.

EXCHANGE.—Land, fresh water and marine shells from France and all other regions—shells also purchased readily. Species of the genus *Pecten* solicited.—*Mr. Bavay, Grand rue, Brest, France.*

FOR EXCHANGE.—The beautiful *Anodonta suborbiculata* Say and *corpulenta* C'p. from Thompson's Lake, Ill. Also many fine Unios from Spoon River, Ill. Fine *Helix multilineata* Say, and others. Will exchange for any species, not in my collection, land or sea.—*Dr. W. S. Strode, Bernadotte, Ill.*

A FEW NEW AND RARE SHELLS for exchange for other rare shells. *Clementia subdiaphana* Carpenter, *Nassa californiana* Conrad, *Surcula carpenteriana* Gabb, *Cancellaria crawfordiana* Dall.—*J. S. Arnheim, 8 Stewart St., San Francisco, Cal.*

EXCHANGE.—Offered British shells, land, fresh water and marine, for other shells not in my collection.—*E. R. Sykes, 15 Doughty St., London, W. C., England.*

WANTED.—Pacific Coast land and fresh water shells, slugs included. Will give British land and fresh water and marines, or Virginia land and fresh water species. Address, *Capt. W. J. Farrer, Box 43, Orange, Va.*

OFFERED—*Helix profunda, tridentata, albolabris*; *Zonites fuliginosus, inornatus, ligerus*; *Patula perspectiva, alternata*; *Selenites concavus*; *Physa heterostrophus*; *Sphærium striatum*; *Ancylus fuscus*. Wanted, United States land and fresh water shells.—*S. H. Stupakoff, E. E. Pittsburgh, Pa.*

WANTED.—*Zonites* from any locality in exchange for British land and fresh water shells.—*Robert Walton, Charles St., Lower Roxborough, Philadelphia, Pa.*

WANTED.—*Vallonia* from all localities.—*Dr. V. Sterki, New Philadelphia, O.*

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MOLLUSKS OF DORCHEAT BAYOU AND LAKE BISTENEAU, LOUISIANA.

BY T. WAYLAND VAUGHAN.

Dorcheat Bayou might, with some degree of propriety, be called a river. It is the largest stream crossed by the V. S. and P. Railroad between Shreveport and Monroe.

It rises in Nevada County, Arkansas, flows across Columbia County, in that state, into Webster Parish, Louisiana. Toward the southern portion of Webster Parish, it widens out, and forms Lake Bisteneau, which extends out of Webster Parish, forming the boundary between Bienville and Bossier Parishes, and empties into Red River, between Bossier and Red River Parishes.

I do not know precisely the length of Dorcheat. Its width and depth are both variable, depending upon the flooding rains. When I collected there in June, during low water, in some places one could wade across without getting in water much over knee deep. The stream was from twenty to fifty feet wide, I should judge. My collecting was done near the railroad crossing. Here Dorcheat had well defined banks, often composed of white sand or pebbles. These pebbles are very note-worthy. In some places, they form the bed of the bayou, and are fine places to collect from.

Lake Bisteneau is almost thirty miles long. Its width varies from thirty to sixty feet in summer to one mile in winter. There are no well defined banks to Bisteneau, the land sloping down gradually to the water's edge. The bottom of this body of water is abominable; one often mires almost to his waist in the nasty mud.

This is a striking contrast to the firm, pebbly bottom of Dorcheat. My collecting was done near Port Bolivar in Bienville Parish.

Before the railroad was built from Shreveport to Monroe, in high water steamboats ascended Lake Bisteneau and Dorcheat Bayou to the steamboat landing two miles from Minden, in Webster Parish.

This stream, Dorcheat and Bisteneau really being one stream, is of considerable interest on account of its shells. Of these it has a fair number of species. There are some interesting facts presented as regards the differences in the mollusks of the different portions of this same stream; for instance: I could not find a single specimen of *Unio hydianus*, *castaneus*, *nigerrimus* or *turgidus* in the portion of Bisteneau that I examined, while all are very abundant in Dorcheat.

The specimens of *castaneus* were nearly all much thickened anteriorly, something that was not noticed in specimens of *castaneus* collected elsewhere. The *nigerrimus* were larger and thicker shells than any other specimens found here. The specimens of *nigerrimus*, *hydianus*, *castaneus* and *anodontoides*, in Dorcheat, were found usually where they had bored into the sloping banks, *about at the water's edge*. The other specimens of *Unio* were found mostly on the rocky bottom. I have only one *mississippiensis* from Dorcheat. It was given me in a large lot of shells from there.

The *anodontoides* from Lake Bisteneau were large, heavy shells. It was the most abundant species of *Unionidæ* there. The bottom of Bisteneau in many places was almost covered with *Campelema decisa*, and *Vivipara subpurpurea*. *Amnicola cincinnatiensis* was very abundant.

The following is a list of the species with their localities.

Unio anodontoides Lea. Bisteneau, Dorcheat.

Unio boykinianus Lea. Dorcheat.

Unio castaneus Lea. Dorcheat.

Unio chunii Lea. Dorcheat.

Unio gracilis Bar. Bisteneau, Dorcheat.

Unio houstonensis Lea. Bisteneau.

Unio hydianus Lea. Dorcheat.

Unio lachrymosus Lea. Bisteneau, Dorcheat.

Unio mississippiensis Con. Dorcheat.

Unio multiplicatus Lea. Dorcheat.

Unio nigerrimus Lea. Dorcheat.

Unio purpuratus Lam. Bisteneau, Dorcheat.

- Unio pustulatus* Lea. Bisteneau.
Unio pustulosus Lea. Bisteneau, Dorcheat.
Unio texasensis Lea. Bisteneau.
Unio trapezoides Lea. Bisteneau, Dorcheat.
Unio trigonus Lea. Dorcheat.
Unio tuberculatus Lea. Dorcheat.
Unio turgidus Lea. Dorcheat.
Unio zigzag Lea. Bisteneau.
Margaritana confragosa Say. Bisteneau.
Anodonta imbecillis Say. Bisteneau, Dorcheat.
Anodonta stewartiana Lea. Bisteneau.
Anodonta tetragona Lea. Dorcheat.
Sphærium transversum Say. Bisteneau, Dorcheat.
Campeloma decisa Say. Bisteneau, Dorcheat.
Vivipara subpurpurea Say. Bisteneau, Dorcheat.
Physa heterostropha Say. Bisteneau.
Planorbis trivolvis Say. Bisteneau.
Amnicola cincinnatiensis Anthony. Bisteneau.

(Extract from Proc. Cal. Acad. Sci. 2d. Ser., Vol. III.)

A NEW VOLUTOID SHELL FROM MONTEREY BAY.

BY J. J. RIVERS.

***Scaphella* (*Voluta*) *Arnheimi*.**

Shell regularly formed, elongate-ovate; body whorl more than two-thirds as long as the spire; the spire an inch long, and made up of six whorls, the terminal nucleus being very small, pointed and oblique, which latter character places this species in the section *Scaphella* of Dall.

Ground color obscure yellow, covered by a layer of chalk-like deposit. The body whorl has some coarse longitudinal elevations and depressions, remnants of former lip extensions, and there are two large patches of dark rusty red at a wide interval which do not appear to form an interrupted band. The aperture is elegantly formed and measures $1-\frac{1}{8}$ inches long by $\frac{1}{8}$ inch wide. The inner lip is regularly outlined on the columella; columellar plaits four,

sharply oblique, the last one strongest, forming a prominent ridge parallel to the canal. The upper outlines of the mouth meet in a sharp angle, but the base has a well defined bifurcation. The whole of the aperture and the edge of the outer lip are heavily coated with enamel of a yellowish tint, and rust stained. Size $3\frac{1}{2}$ inches long, and $1\frac{1}{2}$ inches wide. Animal without operculum.

Dredged in Monterey Bay, California.

MORE ABOUT UNIO LUTEOLUS AND U. RADIATUS.

BY GEO. W. DEAN, KENT, OHIO.

I must admit after reading Mr. Simpson's notes in the December NAUTILUS that *Unio radiatus* is too erratic for my abilities. A species that takes on every possible form I apprehend would baffle any expert.

A specimen exactly like *luteolus* and wholly unlike *radiatus* as I know it, although in the Lea collection labelled *radiatus* with the locality Newton Creek, N. J., would, I fear, get into my collection in the tray with *luteolus*.

Locality is certainly important but with me does not overshadow everything else, and labels have told me so many lies that I have not the respect for them that I otherwise should have. With me the shell is the *central* idea, not the locality or the label. These are usually aids in determining species—not always.

Mr. Lea named a shell, now found in the Mahoning, *Unio subovatus*, though from what locality his types came I do not know. It is now known to be the mature male of *U. occidentis* Lea. The following are, I think, all *occidentis*: *U. ventricosus* Barnes, *U. ovatus* Say and *U. cariosus* Say.

Another Mahoning River shell Mr. Lea named *U. Kirtlandianus*. This is probably a variety of that protean species *U. subrotundus*, Lea.

It is a beautiful shell when young and may very properly retain the name as a variety.

I am in favor of weeding out the surplus names as fast as possible, but I apprehend that both *luteolus* and *radiatus* will remain good

and well defined species, all attempts to connect them proving failures.

I recognize the existence of abnormal sports and possibly hybrids and albinos, etc. These I did not contemplate, nor did I consider very young or old and eroded or decayed specimens. Barring these I still think I could find a dividing line sufficiently distinct.

I have not seen the dark colored *U. borealis* Mr. Simpson mentions but the types were furnished to Mr. Gray by Mr. Latchford of Ottawa, Canada and were taken from the Ottawa river. Mr. Latchford has given me a good suite of like specimens. They seem distinct enough for a good species but it is a close relative of *luteolus*, so close indeed that very young specimens are not easily separated. The glass, however, shows the lines of growth a little coarser and the shell consequently a little rougher.

My mind still dwells on the wonderful vagaries of the *Unio radiatus* as described by Mr. Simpson. I should have some dread of looking over the Lea collection with him for fear of getting so confused that I should not know my wife unless I had her labeled and was sure of her locality.

ADDITIONAL U. S. FISSURELLIDÆ.

We are informed by Mr. T. H. Aldrich that two species were omitted from the Catalogue of this family published in the last NAUTILUS, viz:

GLYPHIS ALTIOR Meyer and Aldrich.—Eocene, Ala. Jour. Cin. Soc. N. H. 1886, p. 41, pl. 2, figs. 16, 16a, 16b. Described under the genus *Fissurella*.

PUNCTURELLA JACKSONENSIS Meyer.—Eocene, Jackson, Miss. Bericht der Senckenbergischen naturforschenden Gesellschaft zu Frankfort a. M., 1887, p. 6, pl. 1, fig. 15.

The types of both of these species are in the collection of Mr. Aldrich.—H. A. P. & C. W. J.

**PALUDINA JAPONICA MART. FOR SALE IN THE SAN FRANCISCO
CHINESE MARKETS.**

BY WILLIARD M. WOOD, SAN FRANCISCO, CAL.

While on my way down town to business from my residence one morning, about nine o'clock, I found it necessary to pass through Chinatown in order to reach a certain store where I desired to leave an order, and while walking through the narrow, crowded, ill-smelling streets of that portion of the city, which by the way, contains some twenty-five thousand Chinese, my attention was called to a very large flaring red sign, upon which were Chinese letters, hung in front of a Chinese vegetable and butcher shop. I stopped a few moments to glance down toward the bottom of this sign, and saw a good sized wooden bucket. This was filled up to the top with dirty looking water and little brown shells.

I examined one and found it alive. Now was my chance to obtain a Japanese species for my cabinet; a species which I had never seen alive in this State before.

I found the proprietor of the shop and said to him, "Where did you get these, John?" "Me no sabbe," was his reply. Then I ventured to ask him for how much he sold them, and again came his reply, "Me no sabbe." Just then a Chinamen who was standing by, turned around, and evidently saw that we could not make each other understand, for he stepped up to me and said in very good English, "What you want? I tell him. I speak English."

By this fellow acting as interpreter, I found out that the shells in the bucket were the first lot brought alive from Japan. He informed me that they were called by the Chinese "Teen Law." I immediately asked him for the translation of this name. It means Field Shell.

He went on to tell me that these shells were very good to eat, and he had just bought some, intending to take them to his wife. She would throw them into boiling water, letting them remain for a few moments. Then they were to be taken out, the operculum removed, and the foot separated from the soft body, salted, peppered and eaten.

Having asked all the questions I desired, I thanked the interpreter and then purchased some, for which I paid the small sum of ten cents per dozen.

I visited the aforesaid Chinaman the next day intending to buy a few more of the shells, but was told that so eager were the Chinese in this city to eat the delicious meat of these shells that all of them had been sold in a very short time after arriving from the Steamer.

Not knowing the exact name of this species, I forwarded a few to my ever-helpful friend, Mr. Wm. J. Raymond of Oakland, Cal., who, comparing them with some of his Asiatic *Paludinidae*, found them to be identical with a pair of specimens under the name of *Paludina Japonica*, Mart.

While preparing some of the shells for my cabinet, I discovered that each specimen contained inside, from twelve to eighteen young shells, about the size of a small *Succinea*.

I have kept two of the larger specimens alive in a tumbler full of water, changing it every two or three days, and often putting in a piece of cabbage leaf for them to feed upon.

A gentleman who recently arrived from Japan, tells me that children of the poorer classes go out in the rice fields, near Yokohama and gather the shells, selling them for a few cents a quart.

As this was the first shipment to America of this species alive, and it being also an additional species offered for sale in the markets of San Francisco, I write the above, hoping that the same will be recorded in the "NAUTILUS" and will be of some interest to its readers.

DO MOLLUSCA SHOW CHANGE OF CLIMATE IN NEW ENGLAND?

BY REV. HENRY W. WINKLEY.

A few days ago I received from Connecticut a series of shells which I was asked to identify. The specimens being in all probability a species of *Goniobasis*, I was not only unable to identify, since I know little or nothing of that genus, but also I had never known an instance of that genus being found in New England. If it is common in Connecticut will someone kindly inform me, and if not, may I ask observers if there is a tendency among shells to migrate in a northerly direction?

Reasons for the above question are as follows: A change of climate is claimed for New England, said change bringing a warmer

temperature and is probably due to the removal of forests. It is a well-known fact that species formerly common on the coast of Maine are now extinct, or nearly so, but these would indicate a colder temperature of the sea.

In support of the changed climate of the land, botany has revealed some proofs. The writer had just published a note on this subject in "The Observer" when the above named shells were received, and hence the question naturally arose, is this species a new-comer from the south? I should be glad to hear from others, for I see no reason why the mollusca may not give interesting facts as well as plants or other animal forms.

[SELECTED.]

ANTIPODEAN OYSTERS.

If I have a deep and lasting affection for anything in this world, it is for oysters. Wherever I go, one of the first inquiries I make is as to the oyster supply. If that is all right, I can look at the rest of things through rosy spectacles. I find a bivalvular view of life is always a cheerful one. I have made many strange acquaintances among oysters in the South Pacific, but never had any great difficulty in adapting myself to my company. You remember how wisely and feelingly dear old Tom Moore sang on that point :

'Tis sweet to know that where'er we rove

We are sure to find oysters delicious, if dear ;

And when we are far from the beds that we love,

We have but to make love to the beds we are near.

I may not have quoted the lines quite correctly, but they are near enough. The chosen Paradise of the oyster-eater is the North Island of New Zealand, for there the oysters are not only delicious but ridiculously cheap. Along the seashore in the lonely, sheltered friths and inlets about Auckland, every rock consists of a mass of oysters clustered together in a wonderful manner, but easily detached and opened when you know how. The best oyster-opening machine is a Maori girl with a brad-awl. The Auckland rock oysters have long, deep, ragged shells, but the oysters themselves are very small, plump, and beautifully shaped, very sweet and not at all coppery or watery. They are equally good raw, stewed, fried, frittered, or in a pie or

timbale. If you want to get them in perfection, however, you should sail down to the Island of Waihéké, in the Frith of Thames, fifteen miles from Auckland, a veritable Fairyland. Have your fairy on hand with her brad-awl; pick out a rock just awash at high tide; sit under a tree-fern, or in the shade of the sail of your boat; swallow the oysters alive as they come from the nymph's deft hands in their pearly, cup like shell; give each just one bite, to bring out all the flavor, as it goes down; and offer up peans of praise to the Giver of all good things. Charles Kingsley declared a genuine Havana cigar was a thing to thank God for, and Charles Lamb wanted a form of grace to be said after reading an interesting book. The soul of man ascends to Heaven in gratitude, without a shadow of profanity, after assimilating a peck or so of Waihéké oysters. They are the most ethereal of all food. From time immemorial the Maoris have come from all the neighboring parts, and even from long distances, every summer, to feast on oysters in a particular bay at Waihéké. I have been there often. It is worth a pilgrimage from the other end of the earth. In the middle of New Zealand there are the famous Queen Charlotte Sound oysters, round and flat, and very firm in flesh, with just that sub-flavor of copper which some connoisseurs set such a value on, but which I confess I am not very partial to. Not but that I can eat a couple of dozen of Queen Charlotte Sound oysters with pleasure at any time—when Auckland rocks are not to be had. In the far south, at Stewart's Island—Providence has been very gracious to those people—superb oysters of quite a different kind are obtained in vast quantities, just when Auckland rocks are out of season. Stewart's Island oysters are large, round, flat, symmetrical oysters, which look simply splendid on the half-shell, and have a grand flavor and plenty of it, which makes them invaluable for cookery. A timbale or soufflé of Stewart Island oysters is something to make your hair curl. But nothing can shake my devotion to the Auckland oysters. It is founded on a rock. I am quite safe in saying that the biggest edible oysters in the world are found at Port Lincoln in South Australia. They are as large as a dinner-plate, and the same shape. I have seen them more than a foot across the shell, and the oyster fits his shell so well he does not leave much margin. It is a new sensation, when a friend asks you to lunch at Adelaide, to have one oyster set before you fried in butter or egg and bread-crumbs. But it is a very pleasant sensation, for the

flavor and delicacy of the Port Lincoln mammoths are proverbial in that land of luxuries. I mean, when they are cooked. Many people eat them raw, cutting off pieces with a knife and fork. I draw the line there. I was going to tell you about the Sydney oysters, in New South Wales, on the other side of the Australian Continent; but I must refrain. The memories are too tender. As Mr. Guppy said: "There are chords in the human heart."—*Edward Wakefield in Once a Week.*

GENERAL NOTES.

SHELLS IN PINE FORESTS.—In "Some Notes on American Land Shells," Prof. A. G. Wetherby states that "it is not worth while to search under or about pine logs for snails . . . and such I have ever observed to be the case in Tennessee, Kentucky and North Carolina; and the scarcity of land shells in forests almost or exclusively pine, is a fact well known." This statement has been of especial interest to me, having collected mollusca in Switzerland for years. There pine—especially fir—are the principal, and to a great extent exclusive, components of the forests in the valleys, and to a great percentage in the mountains, both Alps and Jura, and many of these forests are rather rich in snails. I can state from remembrance that almost all the land mollusca living in forests at all are found also in pine woods; and on the very trunks, logs, etc. of the same wood I collected *Limax*, *Vitrina* (as high as 3 feet from the ground), *Helix* (*personata*, *obvoluta*, etc.), *Buliminus montanus* sometimes higher than can be reached by the hand; *B. obscurus*; *Clausilia*, different species, etc.—*Dr. V. Sterki.*

LAND SHELLS IN PINE WOODS.—As a supplement to Dr. Sterki's observations, we must say that our collecting in pine districts both North and South, has given the impression that Prof. Wetherby's conclusion is correct as far as the Eastern U. S. is concerned. We have always found land shells rare in pine woods. In the Catskill Mts. where the writer collected during the past summer, the land shells ascend only as far as deciduous trees grow, none being found in the coniferous belt.—*H. A. P.*

MR. CHAS. T. SIMPSON left Washington last month for a collecting tour in Florida.

THE PHYSA seem to be a rather difficult object of study, as they present various aspects in different ages and from different places. They should be carefully collected and labelled and compared from a locality in the various seasons, as far as possible.—Conf. Mr. Stearn's article in NAUTILUS IV, 5.—*Dr. V. Sterki.*

FLORIDA HELICES.—We collected 500 well developed *Helix jejuna* on the tops of grass and weeds where they had taken refuge from the water a foot or more in depth. We also found a small form of *Vertigo ovata* and *V. oculum* Sterki, also *Helix auriculata* and a variety of *Helix Postelliana* in great abundance. The water had driven them out to where they were easily found.—*Geo. W. Webster, Lake Helen, Florida.*

IN *Zoe*, vol. II, p. 134, Mr. Henry Hemphill has given a list of the West Coast mollusks which he has himself eaten, or known to be eaten by others. "All four of the Abalones, *rufescens*, *corrugata*, *fulgens* and *Crachrodii*, are edible, and their fine flavor has long been known to the sailors, fishermen and ranchers along the coast of California."

HELIJ JEJUNA is found in the pine woods of Florida, and, so far as I know, is the only snail found in high pine timber.—*Geo. W. Webster.*

A specimen of *Pleurotomaria Adansoniana* Crosse & Fischer, lately found on the Island of Tobago, West Indies, has been purchased by Mr. R. F. Damon, of Weymouth, England. It is the largest specimen of the species known. Mr. Damon has published a life-size figure of this magnificent specimen.

EXCHANGES.

MARINE, land and fresh-water shells to exchange for the same from other localities. Lists exchanged. Would also exchange shells for works on conchology.—*Thomas Morgan, P. O. Box 164, Somerville, N. J.*

FOR EXCHANGE.—Land, fresh-water and marine shells from East and South-east Fla., for shells from other localities.—*Geo. W. Webster, Lake Helen, Volusia Co., Florida.*

I STILL HAVE a few more sets of California land, fresh-water and marine shells to exchange for other Pacific Coast and Eastern species, etc. Kindly send lists to—*Williard M. Wood*, 2817, *Clay St., San Francisco, Cal.*

VALLONIA WANTED.—Dr. V. Sterki, of New Philadelphia, Ohio, desiring to make a critical study of the American forms of this group, solicits specimens of *Vallonia* from all parts of the Country. Named sets will be returned to each person contributing specimens. The editor heartily recommends collectors to communicate with Dr. Sterki.—*Ed. Nautilus.*

NEW PUBLICATIONS.

PROCEEDINGS OF THE CALIFORNIA ACADEMY OF SCIENCES, III, Sept. 1, 1891, contains the following conchological papers:

Notes on the Subalpine Mollusca of the Sierra Nevada near Lat. 38°, by W. J. Raymond, with appendix by Dr. J. G. Cooper. A valuable paper, giving the altitudes at which many species were found, with other useful notes. In an appendix Dr. Cooper gives additional notes on the same subject and describes and figures *Sphaerium Raymondi* n. sp., *S. lenticula* Gld., *S. partumieum* Say, *S. truncatum* Linsl., *Ancylus caurinus* Cp., *A. fragilis* Tryon, *Planorbis suberenatus* var. *disjectus* n. var., with many useful comparative notes. As a generic term for the "calyculate" species of *Sphaerium*, Dr. Cooper proposes *Primella*. This name becomes a synonym of *Calyculina* Clessin, founded upon the same peculiarity. *Planorbis suberenatus*, v. *disjectus* is a form like Ingersoll's *P. plexatus*, having the inner whorls on a different plane from the last one.

On land and fresh-water shells of Lower California, by Dr. J. G. Cooper. The following species are described: *Bulimulus inscendens* W. G. B. var. *Bryanti*, *Rhodea californica* Pfr. subsp. ? *ramentosa*. The last is an extremely interesting discovery, as the genus has been supposed to be entirely South American, the Californian citations of earlier authors having been discredited by many.

CATALOGUE AND SYNONYMY of the recent species of *Muricidae*, by Frank C. Baker. The species of *Muricinae* are enumerated in this paper by Mr. Baker, with notes on their distribution, variation, etc.



Dr. WESLEY NEWCOMB

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IN MEMORIAM—DR. WESLEY NEWCOMB.

Dr. Wesley Newcomb, the last of the old school of conchologists, died at his home in Ithaca N. Y. on the 26th. of January at the advanced age of 84 years. His name belongs on the roll of honor as one of a distinguished group of American Naturalists, who made themselves illustrious by their services in the development and advancement of the study of Natural History in this country, and their contributions to scientific knowledge. Among those who may be specially regarded as Dr. Newcomb's contemporaries, the names of Gould, Binney the elder, C. B. Adams, P. P. Carpenter, Bland, Conrad, Lea, Anthony, Couthouy etc., at once occur. While Lea and Jay were among the last to pass within the folds of

“ * * * the low green tent,”

before Dr. Newcomb, sad as it was, no doubt, to him, to note the loss of one old friend after another, he was happy in this, that his prolonged life, brought him in contact with many kindred spirits among the younger men and workers of the present, and he had the knowledge of their friendship and regard as a consolation.

In his early life he was more fortunate than many of his scientific friends. He had the conspicuous advantages of excellent teachers and a good education. He first attended the Academy at White Plains N. Y., and afterwards the Rennselaer now the Polytechnic Institute, at that time in charge of one of the best of the earlier scientists, Professor Amos Eaton; subsequently at the Jefferson Medical College, Philadelphia, and last at the Castleton Medical College, Vermont, where he graduated most creditably. As a pupil of Professor Eaton, he was, to use his own expression “ forced into

the study of *shells*," in order to intelligently study *fossils*, of which otherwise he would have learned but little that was satisfactory. Living or recent shells were then termed "*Concha Marina*"—a lumping together amusingly indefinite and vague as seen in the light of to-day. To quote him further "I fancied recent shells would furnish a key to Paleontology and I expected in a few weeks of study to master the science of conchology." The result was somewhat disappointing; he found as all true students have found, whatever the path of study, that fresh vistas, eternally new, are constantly opening, and that with increased knowledge comes a wider and more distant horizon, and so like others who have the love and thirst and courage of learning, undaunted he kept right on.

His father, Simon Newcomb, of the fifth generation of the family in America, the first being Andrew who came to this country in 1635, was a physician. The son it will be noticed followed the father's profession. In 1838 he was fortunate in making a marriage that was in every way congenial; his wife a most estimable woman, his companion and friend for 54 years, survives him. After practising medicine in Albany, and a prolonged visit to the Antilles in 1846-7, in 1849 he went to California, thence to the Hawaiian islands in 1850, where he resided for five years. Here the opportunity for studying the interesting shells of the *Achatinellidae* was open to him, and he added over a hundred species to the number previously known. His exhaustive series of these beautiful forms is probably the finest extant, and the conclusions reached by him are without doubt more nearly correct, than those of other authors who have published on this rather difficult group.

In 1856 he returned to New York. In 1857 he went to Europe and part of the time had Dr. Gould for a companion. In London he had the pleasure of meeting many of the leading naturalists of the old world, Reeve, Gray, Sowerby, Adams, Hanley, Owen and others, and Deshayes, Kiener, Bernardi, Hupé and others in Paris. On his return to the United States he went to California in 1858 and established himself as a physician in Oakland, where he became well and agreeably known and soon had an ample practice. Here as elsewhere he continued his conchological studies, ever enthusiastic and ever ready to assist others as he had been from the beginning and was unto the end, all the while adding to his collection, already magnificent, and one of the finest and best arranged in the world. His generous encouragement to collectors as well as

occasional field-work himself, resulted in his adding several new species of Land, Freshwater and Marine forms to the molluscan fauna of the West Coast.

In 1867 the Newcombian collection was purchased by Mr. Cornell for the University that bears his name. Doctor Newcomb soon followed it to Ithaca and its re-arrangement and installation in the Museum of said institution, received his personal attention.

The same liberality that characterized his dealings with brother conchologists and collectors in the past, and the comprehensive system of exchanges established years before, notwithstanding the serious gaps that death had made in the list of his correspondents, continued to yield good fruit, and the collection after it had ceased to be his property, still received his fostering care, and was enriched by numerous and valuable accessions.

Dr. Newcomb was no closet naturalist wise in books yet unfamiliar with the things themselves. His erudition was inclusive and covered both. Twice he visited Europe, the chief object of his first visit being the further study of his profession; thrice he collected on the reefs in the Bay of Panama and southerly to Ecuador; also at many places in the United State of Colombia, Costa Rica, Nicaragua, Honduras and San Salvador. In 1846-7 before briefly referred to, he collected on twenty-one of the West Indian islands from Santa Cruz to Demerara, and subsequently at San Domingo, Hayti and Key West, also one winter on the Gulf coast of Florida where he made a large collection on the shores and by dredging the Sarasote Bays. In 1870 he was appointed sanitary expert to the San Domingo expedition by President Grant, the voyage being made on the U. S. S. Tennessee, and the following year, he was made one of the commissioners, to examine and report on the Sutro Tunnel, Nevada.

Dr. Newcomb was an honorary and corresponding member of many scientific societies at home and abroad. His numerous papers covering the period from 1849 to 1866, have appeared in their publications.

From the above it will be seen, how active was his life, and how enthusiastic his love of Nature. This love possessed him to the last. Of his character nothing can be said but praise. All who knew him will bear testimony to his noble sincerity and great goodness of

heart, unconsciously exhibited in numberless acts of kindness, generosity and benevolence.

So closed a life well rounded with fullness of years, of good will and of generous service.

R. E. C. S.

A NEW FLORIDA UNIO.

BY BERLIN H. WRIGHT, LAKE HELEN, FLORIDA.

Unio Oscari, n. sp.

Shell smooth, oblong, subcylindrical, greatly inflated; abruptly rounded anteriorly below and subangular above; basal margin subemarginate, posterior margin truncate and biangular, dorsal margin slightly arched; valves solid and not thick; beaks not prominent and always eroded; epidermis reddish-brown, darker toward the umbos and in the juveniles with fascicles of broad greenish and narrow orange-colored rays; umbonial angle rather sharp; posterior slope depressed in adults but broad; sides deeply grooved near the umbonial ridge with concentric rounded furrows; cardinal teeth very broad but depressed and not thick, oblique, very variable but usually double in the left and single in the right valve; lateral teeth curved and double in left valve; cavity of the beak nearly obsolete, cavity of the shell deep; cicatrices well impressed, the anterior distinct, posterior confluent, dorsal under the base of the posterior branch of the cardinal tooth; nacre purple and somewhat iridescent.

Diam. .8, length 1, breadth 2.4 in. (*extreme*).

Habitat. A creek from Lake Osceola, at Winter Park, Florida.

Collections of G. W. and O. B. Webster, B. H. and Dr. S. H. Wright, Museum Acad. Nat. Sciences, Phila. and National Museum.

Remarks. Over 100 specimens of all ages of this well marked and beautiful species were taken by the Messrs. Webster and submitted for examination. They are remarkably uniform in character and most nearly related to *U. Aheneus* Lea, from which it differs in having a smoother and nearly *polished* epidermis, cavity of the shell very much deeper and the lateral teeth shorter, heavier and wider.

It must not be confounded with *U. Hazellhurstianus* Lea, which has a rougher, blackish epidermis, greater breadth and not so inflated.

We take pleasure in naming this species for the discoveror, Mr. Oscar B. Webster, of Lake Helen, Florida.

ON THE SPECIES OF DONAX OF EASTERN NORTH AMERICA.

BY W. H. DALL.

Genus DONAX Linné.

The name *Donax* is derived according to most authorities from a Greek word meaning a reed or pole, perhaps in allusion to the radiating striæ which might recall a tuft of reeds. This word is derived from the feminine verb *doneo*, to wave or shake, and the author of the genus has regarded the resulting noun as feminine, forming the terminations of his adjective specific names in *a*. Some later authors have taken the derivative Latin *Donax* a reed, or, secondarily, a slender fish (Pliny), as the original form and have regarded the word as masculine. It would seem best to follow the original usage. In the endeavor to identify some species of this genus from the Tertiaries of North Carolina it has been necessary to review the recent species of the genus from the eastern coast of the United States and the result may be summarized in the following table.

DONAX s. s.

A. With a distinctly sculptured lunule.

a. Striæ punctate, lunule smaller than the truncation.

D. denticulata Linné. Texas, Bahamas, West Indies to Rio Janeiro.

b. Striæ simple, lunule co-ëxtensive with truncation.

D. rugosa Linné. Extra-limal, West Indies to Rio.

B. Without lunule, striæ simple.

1. Sharply truncate.

a. Riblets of the truncate area simple.

D. striata Linné. Extra-limal, Antilles, Colon.

D. Roemeri Phil. Short, triangular. Galveston to Vera Cruz.

D. variabilis Say. Longer, sculpture feeble. Hatteras to Galveston; W. I.?

b. Riblets granular or vermiculate.

D. texasiana Phil. Small, shape of *variabilis*. Galveston to Vera Cruz.

2. Posterior end more rounded, sculpture feeble.

a. Shell compressed.

D. fossor Say. Olive with blue rays. New Jersey to Mayport, Florida.

D. incerata Hanley. Small, subovate, very flat. Extra-limital, Bahamas.

b. Shell inflated.

D. tumida Phil. Small, very stout, polished. St. Augustine to Texas and Vera Cruz, Mexico.

IPHIGENIA Schumacher.

I. brasiliama Lam. Lateral teeth obsolete. Indian River, Florida south to Rio Janeiro.

Donax protractus Conrad is an extremely large and senile specimen of *D. fossor*. *D. variabilis* presents similar modifications when very old, becoming abnormally long and arcuate. *D. parvula* Phil., is the very young *D. fossor*. *D. Lamarekii* Desh., is identical with *D. striata* Linné. *D. angustatus* Sow. is a well-grown *D. fossor*, not quite so old as the type of *protractus*. *D. elongatus* Sow. and *Hanleyana* Phil. (*fide* Sow.) equal *rugosa* Linné, *non* Sow. The writer has received adventitious specimens of *D. californica* Conr., *D. navicula* Rye, and *D. punctostriatus* Hanl. from Florida, as indigenous to that coast. The following species are known in the fossil state from the eastern United States: *D. idonea* Conrad is supposed to be Miocene and was described from a valve cast up on the coast of North Carolina and supposed to be from a submarine bed of fossils; *D. emmonsii* Dall (Emmons Geol. N. C. p. 298, fig. 227 which has been misplaced in the text) from the later tertiaries of Cape Fear River; *D. aequilibrata* Dall, same locality, collected by Mr. C. W. Johnson; *D. fossor* Say occurs in the Pliocene of Florida and South Carolina; *D. variabilis* in the Pleistocene of South Carolina. The Miocene references to these two forms are in need of confirmation and the *variabilis* of the Pliocene of Tuomey and Holmes is *D. fossor*. The Eocene forms referred by Conrad to the genus *Egeria* are doubtfully related to *Donax*. *D. aequilibrata* may be briefly characterized as follows: shell longer in proportion to its height than in any of our recent species, rounded in front, the posterior

end rostrate and pointed; truncated area impressed, its borders not carinated and ill defined, rostrum faintly grooved, the rest of the shell polished, with obsolete impressed lines; inner margin denticulate; hinge teeth well developed, laterals strong and near the cardinals; pallial sinus rounded and extending a little in front of the beaks: the latter are well-defined, not prominent and nearly central. Lon. of shell 17, Alt. 8.9, diam. 6 mm.

MOLLUSKS AS CAT-FISH FOOD.

BY CHAS. C. ADAMS, 806 EMPIRE ST., BLOOMINGTON, ILL.

In the NAUTILUS for Dec., 1891, Dr. W. S. Strode spoke of the destruction of Anodonta which some thought was the work of cat-fish.

Speaking of the food of the cat-fish, *Ictalurus nebulosus*, L. S. in Vol. II, p. 461, Bull. Ill., St. Lab. Nat. Hist., he says: "Mollusca make one-fifth of the entire amount of the food—more than one half of them Sphaerium. This genus made nearly all the food of a large group taken from the Illinois River at Pekin in September, 1882, and also of two other specimens taken in the Illinois River at Peoria in Oct., 1887. Univalves were rarely present, amounting to only two per cent. of the food, taken, however by eight of the specimens. These included the usual forms—*Valvata*, *Melantho*, and *Amnicola*, taken with two or three specimens of *Physa*. Examples of *Pisidium* were rarely noted, and two had eaten Unios."

Speaking of *Ictalurus punctatus*, Raf., p. 456, he says; "Molluscan food was a decidedly important element, being found in fifteen of the fishes and amounting to fifteen per cent. of the whole. Several specimens had taken little or nothing else—notably six secured at Havana in Sept., 1887, and one at Peoria in Oct., of the same year. The Mollusca were about equally divided between gasteropods and lamellibranchs, the former largely *Melantho* and *Vivipara*, the latter usually *Unio* or *Anodonta*."

"Notwithstanding the number of bivalves eaten by these fishes, no fragment of a shell was ever found in their stomachs, but the bodies of the animals had invariably been torn from the shell while yet living as shown both by the fresh condition of the recently indigested specimen and likewise by the fact that the adductor

muscles were scarcely ever present in the fragments. Indeed, in only a single bivalve had the posterior adductor been torn loose. The Unionidae were usually large and thin—probably in most cases Anodonta.

“I have been repeatedly assured by fishermen that the cat-fish seizes the foot of the mollusk while the latter is extended from the shell, and tears the animal loose by vigorously jerking and rubbing it about. One intelligent fisherman informed me that he was often first notified of the presence of cat-fish in his seine, in making a haul, by seeing the fragments of clams floating on the surface, disgorged by the struggling captives.”

“Still more interesting and curious was the fact that the univalve Mollusca found in the stomachs of these fishes were almost invariably naked, the more or less mutilated bodies having only the opercles attached. How these fishes manage to separate mollusks like *Melantho* and *Vivipara* from the shell, I am scarcely able to imagine, unless they have the power to crack the shells in their jaws as a boy would nuts, and then pick out the body afterward. Certainly the shells are not swallowed, either whole or broken.

“The number of Mollusks sometimes taken by a single cat-fish is surprising. As high as one hundred and twenty bodies and opercles of *Melantho* and *Vivipara* were counted in a spotted cat-fish taken at Havana in September of last year.”

PUBLICATIONS RECEIVED.

TERTIARY MOLLUSKS OF FLORIDA, by W. H. Dall. Part II. *On the Marine Pliocene Beds of the Carolinas.* (Trans. Wagner Institute, 1892.) In connection with his studies of the Caloosahatchie Pliocene fauna, Dr. Dall found it necessary to consider the other east American faunas supposed to be of the same age. The area where Pliocene might be expected to occur is bounded on the north by part of Virginia, and extends southward along the coast to South Florida. In his studies of the Carolinian fauna, which Heilprin has called “Carolinian or Upper Atlantic Miocene,” Dr. Dall was “forced to the conclusion that the fauna catalogued and illustrated by Tuomey and Holmes in their ‘Pleocene Fossils of South Carolina’ was not a true fauna at all, but a confusion of several distinct faunas, of which one was of true Miocene age, like

the Virginia Miocene, while another might reasonably be regarded as genuine Pliocene, and the stratigraphical equivalent in South Carolina of the Caloosahatchie beds of Florida.

"These views having been communicated to Mr. Joseph Willcox, of Philadelphia, that gentleman, with the assistance of Mr. Chas. W. Johnson, Assistant Curator of the museum of the Wagner Free Institute of Science, undertook to contribute to the solution of this interesting problem. In the autumn of 1891 Mr. Johnson, under the direction of Mr. Willcox, after conferring with the writer, undertook the search for genuine Pliocene beds in South Carolina. It was thought that the search would be most likely to be successful on the Waccamaw River and vicinity, a majority of Tuomey's really Pliocene species having come from that region, while the seaward position of it relative to known Miocene of the State enhanced this probability."

The sections obtained by Mr. Johnson during his investigations, and the collections obtained, enable Dr. Dall to "assert with confidence that—1, the presence of genuine Pliocene beds has been established in both the Carolinas; 2, the Pliocene of Tuomey and Holmes has been shown to be a confusion of species belonging to at least two horizons; and 3, that the classifications based upon the supposed characteristics of this non-existent fauna may now be consigned to oblivion, or at least removed from the geologic pathway in which they have been so long a stumbling-block. That their biological anomalies enabled the writer practically to predict this result is satisfactory testimony to the value of paleontology in geological work—a value which some modern writers have too hastily called in question."

The general conclusions reached upon the conditions from the close of the eocene to the present time are of such general interest that we cannot forbear quoting them in full:

"The close of the Eocene was marked by a movement in elevation which raised Central Florida as an island above the level of the sea, separated by a wide strait from the continental shore-line of Georgia. At the same time a change of conditions took place by which the character of the fauna was subjected to a notable alteration. *Nummulites* and *Orbitoides*, genera which had formed until then most conspicuous members of the fauna, together with other foraminifera of smaller size, disappeared entirely, with numerous molluscan genera, and were replaced by others, notably *Orbitolites*. The fauna was a subtropical assemblage similar to that of the Central Antilles, and this continued for a time to be its character. Orogenic changes elsewhere intervened, and, probably by modifying the course of

the ocean-currents, affected the character of the Floridian fauna even more profoundly than did those changes which terminated the Eocene.

"The period between the inception of the Miocene and the modification of its original fauna covered the deposition of the beds comprising the Chattahoochee group of Langdon and the Tampa group of Dall, and, from the fact that its warm-water fauna is best displayed in the Chipola beds of Northwest Florida, along the river of the same name, may be called the *Chipola epoch*. During this epoch sub-tropical mollusks, such as *Cymia* and *Voluta*, flourished as far north as New Jersey. The temperature-indications of the fauna do not differ essentially as far as our knowledge goes, from those of the previous later Eocene fauna. At no succeeding epoch do we find subtropical or tropical mollusks extending northward to such a distance from their present range. If any of the leaf-beds of Greenland are really Miocene, these facts authorize the suspicion that the period when walnuts ripened on the shores of the Arctic Sea may have been synchronous with the warm Chipola epoch of the early Miocene.

"Whether an eastward deflection of the Gulf Stream, connected with elevation of the Great Carolinian Ridge, or some other undetermined cause, offered the opportunity, a colder inshore current seems to have crept southward along the continent, penetrated the strait between Georgia and Florida, and washed the northern shores of the Gulf of Mexico. With it came the cold-water fauna appropriate to its temperature. This fauna began early in the north, nearly the whole mass of the New Jersey, Maryland and Virginia Miocene being of this character. Southward the mass relative to that of the Chipola epoch gradually diminishes, being less in the Carolinas and least in the Floridian region. With this fauna were introduced the conspicuous forms which are known as characteristic of the Miocene of Maryland and Virginia, the large Pectens and Arcas, *Venus* and *Ecphora*. Profusely developed about Chesapeake Bay, where it is found in those beds to which Darton and the writer, independently, came to apply the name of Chesapeake, the period in which it flourished may appropriately be designated as the *Chesapeake epoch*. The fauna introduced at this time has left lasting traces on the fauna of the Gulf of Mexico even to the present moment, but never reached as far south as the Florida Keys or the southern portion of the peninsula. The faunal change was decidedly the most important mutation which is traceable in the fossil vertebrate faunas of the Gulf and Floridian region during the whole of Post-Eocene time.

"The Chipola epoch here, in general, was a period of very slow and gentle elevation, followed at or near its close by a slight depression equally gentle.

"The Chesapeake epoch in the South was in the main a period of quiescent deposition, and was closed by a very important movement in elevation. In the Central American region (notably Costa Rica), the Miocene rocks were elevated to a height of 12,000 feet above the sea. The Panamic connections between the Caribbean Sea and the Pacific Ocean were definitely terminated, and the connection between the continents of North and South America finally brought about. On the northern shores of the Gulf of Mexico the elevation was more moderate, but considerable, and by it the island of Florida was united to the Georgian mainland and the previously existing strait permanently closed. This event, in the classification proposed by the writer, terminates the Miocene.

"The products of erosion resulting from the rising of the land were probably those laid down as the Grand Gulf beds of Hilgard and the Altamaha Grits of Georgia. The water in which they were deposited was for the most part fresh or brackish, and the littoral subsidence so gradual as to practically exclude the sea and its fauna.

"The Pliocene of Eastern America, as understood by the writer, begins with the culmination of the movement in elevation just described, and ends with the beginning of the Glacial period.

"The elevation on the continent resulted in the immediate increase of fluvial erosion, and the continued and accelerated creation of perezonal formations similar to the above-mentioned Grand Gulf beds, especially the Lafayette or Appomattox formation of McGee. The discharge of immense quantities of sediment must have rendered the shores less adapted to profuse molluscan life than they had been during the Chesapeake epoch. At all events, the Chesapeake fauna seems to have receded, and to have been gradually followed up by the warm-water fauna which succeeded the Chesapeake and is preserved in the Caloosahatchie beds. As the peninsula of Florida has preserved an unbroken record of this era, it would seem appropriate to apply to it the name of the Floridian epoch, and slightly modifying Prof. Heilprin's use of the term, to refer all deposits of similar paleontologic contents to a single assemblage in the system under the name of the Floridian group.

It is probable that the South American vertebrates, such as *Glyptodon*, which found their way northward after the union of the continents, did not immediately reach the Floridian peninsula; but, whatever their migrations, it is certain that during the Middle Pliocene they made their appearance in that region. Their bones, sandwiched between fossiliferous rocks of Pliocene age, establish this fact beyond controversy.

The invertebrates appear—in Florida, at least—to have flourished peacefully, and the extinction of some of the most conspicuous forms of the fauna appears to have been brought about by a movement in elevation which raised their favorite shallows above the sea—an elevation not necessarily of many feet in altitude. At all events, a majority of those species which live preferably in moderate depths of water, as opposed to littoral forms, still persists in similar situations, unmodified to any notable extent.

The orogenic independence and singular tranquillity of the area which originally formed the island of Florida, contrast strongly with the disturbances in elevation or depression of which both continental and Antillean geology give evidence. It would seem almost as if Florida had rested on the axis of the disturbances, and the tilting northward and southward been minimized at that point.

For the beds exhibited in South Carolina along the Waccamaw, above the Cretaceous marl, as sectionized by Tuomey and Johnson, the name of *Waccamaw beds* may be adopted. For those which are found along the estuary of the Neuse River the local Indian name of *Croatan beds* may be used. Both, as will subsequently appear, may be referred to the Floridian group or epoch. The relations of our later Tertiaries may be broadly summarized as follows:

Later Eocene.

Vicksburg group (Jackson, Vicksburg and Salt Hill formations).

Ocala group (Nummulitic beds of Florida).

MIOCENE.**Chipola Epoch.**

Chattahoochee group (Hawthorne and Ocheesee beds).

Tampa group (Shiloh marl, Tampa and Chipola beds).

Chesapeake Epoch.

Chesapeake group (Maryland, Virginia, etc.).

Grand Gulf group (Grand Gulf beds, Altamaha Grit, etc.—Epoch of elevation begun and in progress).

PLIOCENE.**Floridan Epoch.**

Lafayette group (Lagrange beds, Orange sand, etc.; culmination of elevation).

Floridian group (Caloosahatchie, De Soto and Waccamaw beds, etc.).

PLEISTOCENE.**Glacial Epoch.**

A FOURTH SUPPLEMENT TO THE FIFTH VOLUME OF THE TERRESTRIAL AIR-BREATHING MOLLUSKS OF THE UNITED STATES, by W. G. Binney. (Bull. Mus. Comp. Zool. xxii, no. 4). Mr. Binney's series of *Supplements* has become one of the established Institutions of our Conchological World. This last number is no less interesting and useful than its predecessors. It contains a resumé of systematic work in this department from the date of the 3d supplement to July 1, 1891. Most of the descriptions of new forms have already appeared or been noticed in the NAUTILUS, except the following: *Glandina decussata* var. *Singleyana* W. G. B., Central Texas; *Zonites shepardi* Hemphill, Santa Catalina I.; *Z. carolinensis* Ckll., Mts. of N. C.; *Z. diegoensis* Hemphill, Julian City, San Diego Co., Cal.; *Polygyra 7-volva* var. *Floridana* Hemph., Oyster Bay, Fla.; *Pupa coloradoensis* Ckll., and a number of new color-varieties of *Patula* and *Aglaia*.

Mr. Binney gives generic diagnoses of the genera *Pristiloma* and *Punctum*, groups which he had formerly referred to *Microphysa*. Much useful matter has been added to our knowledge of the West Coast Slugs, the figures and anatomical details being especially acceptable. The four plates illustrate the new species and varieties described. There are also numerous figures in the text. We congratulate Mr. Binney on the completion of this supplement, and hope that he will, in due time, give us still another.

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NOTES ON THE COLONIZATION OF FRESH-WATER SHELLS.

BY WM. B. MARSHALL, N. Y. STATE MUSEUM, ALBANY, N. Y.

In the American Journal of Conchology, vol. iv, 1868, p. 245, Dr. James Lewis said:

"With a view to derive useful information for experiments in the colonization of species of mollusca, it may be well to remark that, in continuation of experiments heretofore attempted, in June, 1868, a considerable number of species of mollusca were transported from the Mohawk River to the outlet of Schuyler's Lake, in Otsego County (about 18 miles south from Mohawk). The species which were deposited there are as follows: *Melantho integra* DeKay, *M. rufa* Hald., *Trypanostoma* (Mel.) *subulare* Lea, *Goniobasis niagarensis* Lea, *Somatogyrus isogonus* Say, *Amnicola cincinnatiensis* Anth. and *Bythinella* (?) *obtusa* Lea.

"If in future years any of these species should be detected in any portions of the Susquehanna River, it may be presumed they are derived from stock colonized in the outlet of Schuyler's Lake. Experiments made, having in view the establishment of *Vivipara contectoides* Binney, (*Pal. vivipara* Say), in the Mohawk River and Erie Canal, do not seem to have been successful. It is, however, thought desirable to continue these experiments, as the results of them may possibly be such as, in some instances, to throw light on the causes which influence the production of varieties. Contributions of living molluscs for this purpose are much desired by the writer."

It would be gratifying to know the results of these experiments. Dr. Lewis' language implies that the species which he deposited in Schuyler's Lake in 1868 did not inhabit the Susquehanna nor any of its tributaries previous to that year. Perhaps some of the readers of the NAUTILUS have specimens of some of these species taken from the Susquehanna. If so they may be able to show that Dr. Lewis was mistaken in supposing that the species did not inhabit the Susquehanna; or that his experiments were successful.

So far as *Vivipara contectoides* is concerned, his attempt to colonize it in the Mohawk River and Erie Canal has been eminently successful. The species is firmly established in both the canal and river, and has spread many miles from the place of its introduction. Beautiful specimens are abundant in the neighborhood of Albany, occurring in the Erie and Champlain Canals and in the Mohawk and Hudson Rivers. The specimens found here do not show any variation from specimens taken in the natural habitat of the species.

Incidentally it may be remarked that Dr. Lewis' experiment emphasizes the importance of carefully prepared local lists of species; and the importance of recording the dates on which specimens are collected. There is no doubt that the geographical distribution of many species of mollusca is being more or less influenced by human agencies. This is especially true of fresh-water species. Canals have been dug in various parts of the country, connecting the waters of streams which differ widely in their faunæ. Other canals are in the course of construction and many others are projected. It is probable that some species of fresh-water shells will thus be afforded the means of extending their habitats.

In future years it will be desirable to know, for a given locality, what species are indigenous and what species have been introduced. In order to obtain this knowledge it is absolutely necessary that there should be exhaustive lists or collections of the species of the given locality made before the operation of man's disturbing influences.

ON AN UNDESCRIBED CYTHEREA FROM THE GULF OF MEXICO.

BY W. H. DALL.

Cytherea texasiana, n. s.

Shell resembling in general features *C. convexa* Say, but larger more elongate in proportion and with a more delicately sculptured

surface. Shell moderately inflated, beaks not very prominent, surface white, the young nearly smooth but gradually becoming finely concentrically wrinkled toward the margin and the wrinkles wavy or more or less interrupted; lunule large, similarly sculptured, bounded by an impressed line but not depressed; there is no defined escutcheon; epidermis thin, pale, closely adherent and smooth; interior chalky white, polished; pallial sinus angular and deep; margins smooth; sockets of the hinge deep, hinge teeth normal, slender; the anterior tooth small but well defined.

Shape of the shell very nearly a true oval, the height greatest about midway between the two ends; base and ends evenly rounded. Lon. of shell 67.0; alt. 49.0 diam. 32.0; beaks behind the anterior end 20.0 mm.

This fine species is No. 291 of my list in Bull. 37, U. S. Nat. Mus., where it was referred with doubt to a fossil species which proved to be of a different character. It was first collected by Wurdeman during the earliest Coast Survey work on the Texan coast (about 1856) and has since been sent to the National Museum from Galveston by R. R. Gurley of the U. S. Fish Commission and later by J. H. Singley of the Texas Geological Survey. It is a *Dione* of the section represented by *D. Sayana* or *convexa* and must, when in really fine condition, be a very elegant species.

A FEW OBSERVATIONS CONCERNING DEATH OF FRESH WATER MOLLUSCA.

BY DR. V. STERKI.

In the last number of the NAUTILUS Dr. Strobe reports the death of *Anod. corpulenta* Cpr., in Thompson's Lake, Ill. To his case I would add a few observations of a similar nature, though not so striking, which may, in some way, help to elucidate the question.

A few years ago, at exceptionally low water, I found in the Tuscarawas River, numerous *Unio subrotundus* Lea, dead, in their natural positions, buried in the gravel, the valves slightly gaping. The soft parts were in a more or less advanced state of putrefaction, partly dark colored. This last fall I noticed the same phenomenon in the same place; it was amidst the river bed, around some small low-water banks, in very shallow and comparatively quiet water,

while quite near, in deeper and running water, the mussels were alive and healthy as usual. There is hardly a doubt as to the cause of death in this instance: fish certainly did not kill them, nor any other animal; but evidently it was the sun heating the bottom and the water, probably also changing the latter, and in addition, promoting the development of bacteria, etc., causing disease.

As to the wholesale destruction related by Dr. Strode, the case is somewhat different, since there was a lake 5 miles long, but very shallow, as the doctor says in the April number, and *Anod. corpulenta* lived near the shore. May we not draw the conclusion from these facts, that the long continued heat and evaporation, directly and indirectly, probably were the cause of that terrible dying? On the other hand, we may think that one species is more delicate, more predisposed to and less resistant against certain destructive agents. It is too well known that the past late summer and fall were exceptionally dry, and I presume that not only millions of fish as well as *Najades* and other fresh-water animals fell its victims in a great part of the country—from drying up as well as from deterioration of the water—but also of the minute and delicate land snails a great percentage probably perished.

In October past I visited a few small ponds, sloughs, where the water had dried up for the most part in some, still standing 1-1½ feet deep in others. Most of the aquatic plants, thrifty in spring and early summer, were rotten or in poor condition, a dark, sooty mass covering the bottom, evidently the remnants of decayed organic matter. Of mollusca, there were very few alive, and to my surprise, the *Limnæidæ* were almost all dead, while in one place numerous *Amnicola* were living, in another *Valvata tricarinata*: is it not strange that “pulmonata” could not survive where branchiata were doing well?

Again in November I found on Tuscarawas river, a small mud hole, about 5 feet long, the water two feet deep, on the bottom a thick layer of that dark, soot-like mass. There were a number of *Melantho*, evidently in good health, while I could not detect a single specimen of *Limnæa*, *Planorbis*, *Physa* or *Ancylus*.

These observations were made somewhat hastily, and might have been more exact; yet I think they are not without some interest.

THE LAND MOLLUSCA OF THE CAYUGA LAKE VALLEY.

BY NATHAN BANKS.

Cayuga Lake is one of a series of lakes in central New York. The region around its upper end is very interesting, not only on account of its beautiful and varied scenery but also because of its rich flora and fauna. The hills are high, and there are numerous streams which have worn deep gorges in the hillsides. At the head of the lake is a large marsh. Not far from the lake (about ten miles from Ithaca) are several *Sphagnum* bogs. The varied natural conditions favor an augmentation of species; and, I think for a locality in the northern part of the U. S., the following list is moderately large. Some of the smaller species are not represented, perhaps because I did not look sufficiently close for them. Many notes were made on local variation, distribution and the habits of the more common species. The fresh water shells were also collected and made a good showing. In the list I follow nearly the arrangement of Pilsbry's list.

1. *Selenites concava* Say. Common.
2. *Limax maximus* Linn. Uncommon.
3. *Limax flavus* Linn. More common.
4. *Limax campestris* Binn. Quite common.
5. *Vitrina limpida* Gld. Rare.
6. *Zonites fuliginosus* Griff. Common.
7. *Zonites friabilis* Binn. Rare.
8. *Zonites lævigatus* Pfr. Uncommon.
9. *Zonites intertextus* Binn. Frequent.
10. *Zonites ligerus* Say. Uncommon.
11. *Zonites inornatus* Say. Frequent.
12. *Hyalina nitida* Mull. Not uncommon.
13. *Hyalina arborea* Say. Very common.
14. *Hyalina radiatula* Alder. Frequent.
15. *Hyalina indentata* Say. Frequent.
16. *Hyalina limatula* Ward. Uncommon.
17. *Hyalina minuscula* Binn. Frequent.
18. *Hyalina milium* Morse. Rare.
19. *Hyalina binneyana* Morse. Rare.
20. *Conulus fulvus* Drap. Common.
21. *Gastrodonta multidentata* Binn. Frequent.
22. *Tebennophorus carolinensis* Bosc. Common.
23. *Tebennophorus dorsalis* Binn. Frequent.
24. *Patula alternata* Say. Very common.
25. *Patula perspectiva* Say. Uncommon.
26. *Patula striatella* Anth. Frequent.

27. *Helicodiscus lineatus* Say. Common.
28. *Punctum minutissimum* Lea. Common.
29. *Mesodon thyroides* Say. Common.
30. *Mesodon albolabris* Say. Very common.
31. *Mesodon dentiferum* Binn. Rare.
32. *Mesodon sayii* Binn. Uncommon.
33. *Stenotrema hirsuta* Say. Very common.
34. *Stenotrema monodon* Rack. Very common.
35. *Triodopsis tridentata* Say. Very common.
36. *Triodopsis palliata* Say. Frequent.
37. *Vallonia pulchella* Mull. Very common.
38. *Strobila labyrinthica* Say. Uncommon.
39. *Pupa corticaria* Say. Frequent.
40. *Pupa rupicola* Say. Uncommon.
41. *Pupa armifera* Say. Common.
42. *Pupa contracta* Say. Common.
43. *Pupa simplex* Gld. Rare.
44. *Pupa milium* Gld. Uncommon.
45. *Vertigo ovata* Say. Uncommon.
46. *Vertigo gouldii* Binn. Frequent.
47. *Vertigo bollesiana* Morse. Uncommon.
48. *Vertigo pentodon* Say. Frequent.
49. *Ferrussacia subcylindrica* Linn. Frequent.
50. *Succinea avara* Say. Rare.
51. *Succinea obliqua* Say. Common.
52. *Succinea ovalis* Gld. Frequent.
53. *Carychium exiguum* Say. Rare.

I include *Carychium* on the list because I have always found it, though in damp places, quite removed from bodies of water. It was usually found on the roots of various plants that grew in damp places. The *Succinea avara* was found but once, and not far from water; the *S. ovalis* usually near the lake shore. *Ferrussacia* was frequent under leaves in very damp places. *V. pentodon* was the most common *Vertigo*, often on the exposed roots of cedar. *Pupa simplex* was found but once, and in a very wet locality. *P. contracta* and *armifera* were common in various places; but *P. contracta* was found in more places than *P. armifera*. *P. corticaria* was always seen on trees. *Strobila* was found in places where *P. armifera* and *contracta* were common and *E. multidentata* was occasional. *Vallonia pulchella* could be found both in wet places and under dry stones, high up on hills. *Triodopsis tridentata* was everywhere but *T. palliata* was usually found in damp and shady glens. *S. hirsuta* and *monodon* anywhere under stones and pieces of wood. *Mesodon albolabris* was larger on the hillsides than in the valleys. In some small localities *M. thyroides* was more com-

mon than *M. albolabris*. *M. dentifera* was only seen in very dark, cold, wet swamps, in places where *T. palliata* seemed to flourish best. *M. sayii* was found on hills in dry places. I have noticed a curious habit of economy in some specimens of *M. thyroides*. On watching them crawl alternately over very rough and glazed paper, I saw that while moving over the rough paper the whole length of the foot was upon the paper; but on glazed paper the animal would only touch the paper in two or three points, keeping two or three parts of the foot free from the paper. Thus, the track of the snail over the glazed paper consisted of a series of spots of dried slime where the foot had touched, while the intermediate spaces were perfectly clean. *H. lineata* was usually found in wet and rocky places. *P. striatella* was found in similar locations, while *P. perspectiva* was found under logs and chips of wood in dry places far removed from bodies of water. *P. alternata* hibernates in large communities; forty-four specimens, over a year old, were found under a single overturned rotten stump. *T. carolinensis* usually in rotten logs, but sometimes climbing trees. *T. dorsalis* in very wet places. *H. indentata*, *radiatula* and *nitida* were most abundant in damp places. *Z. inornatus* usually in the valley, while *Z. lavigatus* and *intertextus* were most common on hills and rocky places. *Vitrina* was only found on a low island in a pond, almost at the water's edge. *L. maximus* was sometimes seen quite a distance from buildings. *S. concava* was most common in rocky situations.

A FEW QUERIES AND NOTES.

BY T. WAYLAND VAUGHAN.

In the discussion of Messrs. Simpson and Dean, relative to the distinguishing characteristics of *Unio radiatus* Barnes, and *Unio luteolus* Lamarck, one point seems not to be brought out, that would surely interest all lovers of *Najades*. Are there ever any variations that show the gradual vergence of the hard, highly polished epidermis of *luteolus* into the rougher epidermis of *radiatus*?

Of *hydianus*, a close relative of *luteolus*, I can say: to-day, I examined over 250 specimens (I counted the specimens), from four streams in Northwest Louisiana, to see what variation there might be in the character of the epidermis. In nearly every specimen, the epidermis was perfectly smooth, glass-like, throughout. In a few

large somewhat overgrown specimens, towards the margin of the shells, the epidermis was somewhat rough, corresponding to the lines of growth; but then, not in the least presenting any such appearance as shown by *U. radiatus*.

As showing how variable in form *U. hydianus* is, the following measurements from two female specimens may be of interest.

First specimen, length 61.5 mm., height 42 mm., diameter 36 mm.
Second specimen, length 55 mm., height 33 mm., diameter 20 mm.

The great amount of this variation may be made clear to the eye, by laying off on a line the length of the first specimen, on a line perpendicular to the first, lay off the diameter of the first specimen; on the same lines as axes, lay off the corresponding dimensions of the second specimen.

In this day of scientific enlightenment, men have come to look upon *chance* as having no place in *Nature*—but all is the outcome of certain definite causes, which may often act in a complex manner. Accordingly our friends in the botanical world have tried to explain to us the origin and use of the varied beautiful forms and colors that we find among flowers; the entomologists try to explain to us the origin and use of various colors—some sombre, some gaudy—that we find in the insect world. A certain amount of study has been put upon the origin and use of colors among marine molluscs; and dynamical causes have been proposed for structures found among marine molluscs. Has anyone ever tried to account for the radiations in our *Unionidæ*? or for the magnificent purple nacre of the *Uniones purpuratus*, *graniferus* or *verrucosus*? What is the origin and use of the pustules, found in the many groups of *Unionidæ*? What is the origin and use of the plications in our various plicate *Unionidæ*? Also, have the adult *Unionidæ* been found to have any natural enemies, that feed upon them? Do turtles ever eat *mussels*, might be asked.

These are questions that no one is paying any attention to, seemingly, and surely offer room for much work among students of *Unionidæ*.

WE HAVE LATELY RECEIVED specimens of *Helix vendryesi* n. sp. from Mr. T. D. A. Cockerell, of Kingston, Jamaica. The new form closely resembles *H. sloaneana*, but is more depressed than usual in that species, is more carinated, and of a very handsome dark purple-brown color. It is from Montego Bay, Jamaica.—*H. A. P.*

MORTALITY IN MUSSELS AT ORANGE, VA.

BY W. J. FARRER, ORANGE, VA.

Referring to Mr. Strode's paper in the December number of the NAUTILUS, I, too, have been lately much puzzled at finding dead mussels in large quantities in the ponds about this place; hundreds may be picked up each morning on the edges of one pond, especially that belonging to a grist mill. *U. hyalinus* and *A. williamsii* seem to be the principal sufferers, for although *A. edentata*, *M. undulata* and *U. complanatus* abound in the same pond, only a few empty shells of these latter are found and they seem to have been cleaned, out by raccoons; the other two species are always found with the animal entire and for the most part full of spawn. This, as well as the other ponds about, has been unusually low throughout the last two months and with Mr. Strode I think low water and not catfish, accounts for the bivalve mortality.

I may mention that in the same pond large numbers of catfish have died throughout the summer and autumn; some I took in a dying state had a growth of fungus on the body.

LITTORAL LAND SHELLS OF NEW JERSEY.

BY H. A. PILSBRY.

The Atlantic shore of New Jersey is so sandy that few land snails find suitable conditions there. I have seen specimens of only the following species from the immediate neighborhood of the coast, restricting this to a strip of say one or two miles inland.

***Helix* (*Mesodon*) *thyroides* Say.**

All the eastern New Jersey specimens are thin and light, resembling the *bucculenta* form more than the typical *thyroides*.

Those from Asbury Park are toothless, have the umbilicus half covered, and measure from 17 to 19 mm. diameter.

Specimens from Point Pleasant, N. J., collected by Messrs. F. H. Brown and Witmer Stone are even smaller than those collected by myself at Asbury Park. Compared with the typical *thyroides* these specimens are much smaller, generally more globose and conoidal,

although this character is variable. The umbilicus is about half closed. Specimens measure:

a. Alt. 12, diam. $16\frac{1}{2}$ mm.

b. Alt. $10\frac{1}{2}$, diam. 17 mm.

A very small tooth is developed in some examples. The shells correspond more closely to the southern variety *bucculenta* than to the usual *thyroides* of the north. It appears, indeed, as Mr. Stone has suggested to me, that this form is a member of the Carolinian fauna, which extends far to the northward in eastern New Jersey.

Helix (Mesodon) albolabris maritima Pils.

Many specimens from the vicinity of Cape May, N. J., have been examined, collected by Mr. Witmer Stone and Prof. C. LeRoy Wheeler. They exhibit but little variation. I have also seen specimens from a locality in Long Island, N. Y., and a form which Mr. Bryant Walker tells me is quite similar, has been found in Michigan, inhabiting a locality having much the same physical features as the sand hills of Cape May.

Zonites arboreus Say.

The writer has collected this at Asbury Park.

Philomycus carolinensis Bosc.

A small specimen was found at Asbury Park.

PRELIMINARY NOTICES OF NEW FORMS OF FRESH WATER MOLLUSKS.

BY H. A. PILSBRY.

Vivipara georgiana var. *altior* Pilsbry.

Shell pyramidal, *elongated*, composed of $6\frac{1}{2}$ to 7 whorls, separated by deep sutures. The whorls are flattened or sunken around the upper portion, convex below, giving a decidedly cadaverous appearance to the shell. Some specimens have a scaliform appearance. The surface is marked with growth-lines and irregular wrinkles, but some specimens show distinct spiral line. All of the specimens seen (30 in number) are bleached, but some show faint traces of reddish bands. The umbilicus is narrow, often a mere chink.

Alt. 46, diam. 25 mm.

Alt. 43, diam. 24 mm.

From an aboriginal shell-heap on the left bank of Hitchen's Creek, near the entrance of the St. John's River into Lake George, Florida. Collected by Mr. C. B. Moore.

The great variability of these shells and their distorted aspect inclines me to place them as a local variety of *V. georgiana*, but they are so very different in appearance from that species, that in the absence of intermediate examples, I am inclined to regard them as an individualized race deserving a name.

Fluminicola merriami Pilsbry and Beecher.

Shell small, globose-turbinate, narrowly but distinctly and deeply umbilicated. Spire low-conic, acute; whorls 4, slightly shouldered below the sutures, the upper-lateral portion rather flattened, periphery and base convex. Surface smooth, horn-colored. Aperture oblique, ovate, angled above, broadly rounded below; upper portion of the inner lip adherent to the body-whorl, lower portion arcuate, without a callous thickening.

Alt. 3, diam. $2\frac{1}{2}$ mill.

Collected from a warm spring (temperature 97° F.) in Pahrana-gat Valley, Nevada, by Dr. C. Hart Merriam, and submitted to the writer by Dr. R. E. C. Stearns.

This species differs from *F. fusca* Hald., in the much more distinct umbilicus, thin texture, and the non-thickened inner lip.

Specimens may be seen in the National Museum (no. 123,626) and the Academy of Natural Sciences collections. *F. merriami* will be figured in the monograph of American *Amnicolidæ* now in preparation by Mr. C. E. Beecher and the writer.

GENERAL NOTES.

A CORRECTION. In the March NAUTILUS, p. 127, line 13, instead of *he says* read *Prof. Forbes says*.—C. C. A.

EXCHANGES.—We purpose to devote one of the inside cover pages, hereafter, to offers of exchange, and all subscribers are invited to offer their duplicates and call for their desiderata therein. Exchanges will be inserted free of charge, but they should not exceed five lines in length.—Eds.

A NEW GENUS of *Helicinidæ* has been described by Commandant L. MORELET, in the last number of the *Journ. de Conch.* It is like *Helicina* in form, and in absorbing the internal whorl-walls, but differs in having several plicæ or folds upon the parietal wall. This type, which is named *Calybium*, is from Laos, (Indo-China).

The operculum is unguiform, with terminal nucleus. It apparently represents there the *Proserpina* and *Ceres* of tropical America. The type is *C. massiei* n. sp., a form measuring over three-fourths of an inch in diameter.—*H. A. P.*

DR. W. H. DALL, of the Smithsonian Institution, is about to leave Washington for California, where he will engage in field-work for three months.

RECENT LITERATURE.

STUDIES AMONG MOLLUSKS—INSTINCT AND GENERA, by Henry Hemphill. (*Zoe.*, Jan., 1892). The author discusses certain apparent anomalies in the structure of land mollusks, freely criticising the conclusions reached by the anatomical school of investigators. He elaborates the idea formerly advanced by himself, that snails display instinctive impulses in the building and decoration of their shells. "The shell bears the same relation (mechanically) to the animal, that the web does to the spider." While we are obliged to disagree totally with Mr. Hemphill's conclusions, the paper is still in some respects suggestive.

THE AMERICAN NATURALIST for January, 1892, contains an article upon the shell-bearing mollusca of Portage Co., Ohio, by Mr. Geo. W. Dean. An annotated list of the species is given. The proof-reader is not quite as punctilious as we could desire, in the matter of spelling names, and one or two difficult species are probably wrongly identified, such as *Physa ampullacea* Gld.; but the list is generally useful. *Bythinella nickliniana* is reported from Portage Co., a locality west of any we have hitherto noticed.

The *Naturalist* is now published by Messrs. Binder & Kelly, of Philadelphia, the editors being Professors COPE and KINGSLEY, as in the past. The editors and publishers purpose to make this once excellent magazine even better than it has been in the past.—*H. A. P.*

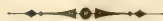
THE NAUTILUS

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DEVOTED TO THE INTERESTS OF
CONCHOLOGISTS.



VOL. VI.

MAY 1892 to APRIL 1893.



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THE NAUTILUS.

VOL. VI.

MAY, 1892.

No. 1.

PATULA STRIGOSA GOULD, IN ARIZONA.

BY ROBERT E. C. STEARNS, WASHINGTON, D. C.

The National Museum has recently received from Mr. Marcus Baker, of the U. S. Geological Survey, numerous specimens (Mus. no. 123,576) of the above snail shell collected by him at Coon Mountain, in Arizona. From Mr. Baker I have learned the following: "Coon Mountain, from which these shells came, is a name locally applied to a possible volcanic crater, situated some ten miles south of Canyon Diablo, Arizona. It is near lat. 35° N., long. 111° W. The crater is some 500 or 600 feet deep, ranging from 5200 feet above sea level at the bottom, to 5700 feet at the crest of the rim. Within the crater is bedded sandstone, limestone (Aubrey) and talus slope. The region is excessively arid. The dead shells are found scattered along the interior slopes of the crater, more especially on the south side. Almost all are dead. I think I found a single living one, in the course of a week's working about, in this vicinity. I do not remember finding any outside of the rim. Many of the specimens were fresh, most of them dead and bleached."

Compared with examples from more northerly regions where this form abounds, and exhibits, as is well-known, extraordinary variability, these Coon Mountain specimens are rather under size or dwarfed. They are also rather flat than elevated, and some of them are more or less angulated at the periphery. The fresher examples are slightly rufous, with two narrow revolving bands on the body whorl.

This species has heretofore been found, I believe, in New Mexico. Mr. Baker's collection carries it farther to the south than before reported.

PRELIMINARY LIST OF NORTH AMERICAN PUPIDÆ.
(NORTH OF MEXICO.)

BY DR. V. STERKI, NEW PHILADELPHIA, OHIO.

It will take several years more before we can attempt a revision and approximately complete a list of this most interesting group of our land mollusca. The past few years have brought us a good number of new forms, and yet we have to expect, not only more such but also a more extensive knowledge of their geographic distribution and local variations. Strange as it may appear, the specimens extant in the many museums and private collections I have examined, represent only a very limited part of our country. There are areas of 100,000 square miles from which none of these minute denizens are known, or only a few from single spots. Very little, in some places nothing, has been collected in the South Atlantic and Gulf States, excepting Florida and Texas: in Kentucky, Wisconsin, Minnesota, the Dakotas, Wyoming, Idaho, Oregon; some more, but still very insufficiently, in a part of the New England States, Pennsylvania, except the southeastern region, Michigan, Maryland, Tennessee, Arkansas up to Iowa and Nebraska, Montana, Washington, Colorado, New Mexico, Arizona, Nevada, not to speak of British North America, a part of whose regions are, however, better known in this regard than some of the oldest states of the Union. Comparatively, most has been done in Maine, Massachusetts, New York, Ohio, Florida, parts of Texas, and California; sufficient to give us a fair knowledge of the distribution of not even a majority of the species, in any one State!

It appears, therefore, advisable to give a preliminary list of the species and forms described and cited as from our continent. In many instances it is impossible, as yet, to say whether a certain form is to be considered a *species* or a *variety*, for want of sufficient material; and future critics will have to decide. In all such cases I prefer, here, leaving the question open, and simply filing the names, and giving localities representing areas of distribution.

There are two groups whose members deserve our special attention and study; that of *P. muscorum* L. and that of *Vertigo decora* Gld. and their allies, and especially of these, any specimens from known localities will be of much value.

A number of forms must be added here, not yet published, as known only from one or few specimens each, most of them, in all probability, being good species. But it must be borne in mind that varieties and local forms very often are of a higher interest than new species for systematic zoology and zoogeography.

The present article has, consequently, two aims: first, to show what is known, at present, of species and varieties and their distribution; second, to point out those parts of the continent where collecting and as far as possible strenuous and careful search is most needed. Any conchologist who has a chance of visiting parts of those "blanks" will be sure to do good work, especially by using expedient methods of collecting: sifting from dead leaves, moss, grass; brushing off rocks, stones, logs, stumps, pieces of bark, old chips, etc. Fine sifted drift on rivers, brooks, etc., should be carefully gathered wherever possible, and the results will, almost everywhere, be richer than expected, not only in Pupidæ but also in Hyalina and other small and minute land shells.

I am indebted to Messrs. H. A. Pilsbry, Edw. S. Morse, Theo. D. A. Cockerell, Henry Hemphill and many other fellow-malacologists all over the country for kindly sending me specimens and valuable notes; to all of them my hearty thanks.

A few notes will be found at the end of the list.

STROBILA Mse.¹

Str. hubbardi Brown. Gulf States.

Str. labyrinthica Say. Eastern Prov.

PUPA Drap.

Subg. Pupilla Leach.

P. muscorum L. (type). Northeastern U. S.

var. —? Nevada.

P. blandi Mse. Rocky Mountains.

P. signata Mouss. Rocky Mountains.

hebes Anc. Rocky Mountains.

sublubrica Anc. Rocky Mountains.

- P. sterri* Voith. (?) Rocky Mountains.
P. sp. Rocky Mountains.
P. sterkiana Pilsb. South (and Lower) California.
P. syngenes Pilsb.² Arizona.

Subg. Leucochila Alb. & Mart.

- P. fallax* Say. All east and S. W. to Arizona.
P. modica Gld. Ga., Fla.

Subg. Columella Mart. (Edentulina Cless.).

- P. edentula* Drp.³ (simplex Gld.). All N. A. except southwest.
 v. *alticola* Ing. Rocky Mts.
 var. ——. Wash., Alaska.

Subg. Bifidaria Sterki.⁴

Sect. ———.

- P. arizonensis* (Gabb) W. G. B. Colo., N. M., Ariz.
 v. *saxicola* Ckll. Colo.
P. corticaria Say. E. of Rockies, except extreme south.

Sect. *Albinula* Sterki.

- P. armifera* Say. All N. A.
P. contracta Say. All N. A. East of Rockies.
P. holzingeri Sterki. Ohio to Manitoba, N. M., Kas.
 v. *fordiana* Sterki. Kas.

Sect. *Bifidaria* s. str.

- P. hordeacea* Gabb. Tex. to Ariz.
P. procera Gld. R. I. to Minn., S. C. to Tex.
P. hordeacella Pilsb. Fla. to Ariz.
P. rupicola Say. S. C. and Fla to La.
P. servilis Gld. La. ?
P. (riograndensis) Sterki mss.). Hidalgo, Tex.

Sect. *Vertigopsis* Ckll. mss.

- P. pilsbryana* Sterki. N. M., Ariz.
P. curvidens Gld.⁵ All N. A. east of Rockies.
 v. *gracilis* Sterki. R. I., Ohio, Tenn.
 v. *floridana* Dall. Fla.
P. pentodon Say. All N. A. east of Rockies.

Subg. Isthmia Gray.⁶

- P. calamitosa* Pilsb. South (and Lower) Cal.
P. hemphilli Sterki. South (and Lower) Cal.
P. clementina Sterki. San Clemente Id., Cal.

Subg. Angustula Sterki.⁷

- P. milium* Gld. All eastern N. A.

Subg. ———.

- P. dalliana* Sterki. Lake Co., Cal.

VERTIGO Müll.⁸*Subg. ———.*

- V. variolosa* Gld. Fla.
V. sp. San Diego, Cal.

Subg. Nearectula Sterki.

- V. californica* Row., type. Cal. (near San Francisco).
 var. *elongata* Sterki. San Clemente Id.
 var. *catalinaria* Sterki. San Clem. and Catalina Ids.
 var. *diegoensis* Sterki. San Diego.
 var. *trinotata* Sterki. Monterey.
 var. *cyclops* Sterki. Placer Co.
V. rowelli Newc. Cal.
V. decora Gld. North.
V. corpulenta Mse. Rocky Mountains.
V. castanea Sterki. Lake Co., Cal.
V. borealis Mor. Alaska.
V. ingersolli Anc. (*californica* Ing.). Colo.
 var. *haydeni* Anc. Cunningham Gulch.
 var. *accedens* Anc.
V. coloradensis Ckll. Colo.
V. hoppei Moell. Greenland, Anticosti.
V. columbiana Sterki mss. Wash., different places.
 var. *utahensis* Sterki mss. Utah.

Subg. Vertigo s. str.

- V. binneyana* Sterki. Manitoba to N. M.
V. pygmaea Drp. Northeast.
 var. *callosa* Sterki. Ohio.

- V. rugosula* Sterki. South Atlantic and Gulf coasts, Cal.
 var. *ovulum* Sterki.⁹ Fla.
V. ovata Say. All N. A.
V. ventricosa Mse. Northeast to Ohio.
V. gouldii Binn. Northeast to Mont.
approximans Sterki. Ill.
V. bollesiana Mse. Maine to Ind., Va. and Tenn. (also West
 Indies.
 var. *arthuri* v. Mart. ?
V. sp. Tex.
V. sp. N. Mex.
V. tridentata Wolf. Me. to Ohio and Minn.
parvula Sterki. Ohio.
V. oscariana Sterki. Fla., Tex., Tenn.

HOLOSPIRA Alb. & Mart.

- H. roemeri* Pfr. Tex. (Mex.).
 var. *minor* Ckll. mss.
H. goldfussi Mke. Tex. (Mex.).
H. arizonensis Stearns. Ariz.

STROPHIA Alb.

- Str. incana* Binn. S. Fla.

* * *

- Pupa krausseana* Reinh. ?
Vert. arctica Wall. ?

1. The proposition to place *Strobila* under *Pupidae* will hardly meet with much opposition; it seems to be its nearest natural position. The soft parts agree with those of *Pupidae*, and so does the shell, except its more depressed form which, however, can be no objection if we compare it with *Hypselostoma*, etc. *Acanthinula*, too, we might range here, as also Morse did,* for the American species.

2. This species is evidently related to *P. australis* Ad. & Ang.

3. There are, among the common low form, high specimens with narrower penultimate and wider last whorl, found everywhere occasionally in this country as well as in Europe; and thus *P. alti-*

* *Pulmonifera* of Maine, p. 32.

cola Ingersoll is not even a true var. here, just as var. *gredleri* Clessin on the old continent. The most beautiful specimens of this formation I have seen are from Maine, in the collection of Mr. Edw. S. Morse.

4. This subgenus—in mss. for nearly two years—will be characterized in another article in the NAUTILUS.

5. *P. curvidens* is very variable. The two extreme forms, *gracilis* and *floridana*, would unhesitatingly be regarded as widely distinct species, if not connected by intermediate forms; the latter comes nearest *P. pentodon*, the former resembles some forms of *P. hordeacella* Pilsb.

6. These species resemble the European forms so much in outline and general aspect that it seems best to range them in this group or subgenus, although the apertural folds are much more developed.

7. The subgenus has been criticised by my esteemed friend, Mr. Pilsbry* as being identical with *Vertilla* Moq.-Tand. If this were the case, it would of course, be worse than useless. *Vertilla* was established for the European *Vert. pusilla* Müll. and *Venetzii* Charp. (*angustior* Jeffr.), on account of their being sinistral. But the two are quite different in structure, for while the former is simply a *Vertigo* reversed, the latter, together with one similarly built, *P. (Vert.) milium* Gld., constitute a peculiar group, which I have called *Angustula*, mainly characterized by the long and high gular lamella and some other peculiarities.

8. It is difficult to draw a limit between *Pupa* and *Vertigo* and may prove to be impossible; if so we will have to regard and treat the latter as a subgenus of *Pupa*, as many prominent European conchologists do. And it appears more natural standing in a line with *Torquilla*, *Pupilla*, *Bifidaria*, and its groups co-ordinate as sections with those of the subgenera named.

9. This interesting form has been detected in eastern Florida, Volusia Co., by Messrs. Geo. W. and his son Oscar B. Webster, of Lake Helen. These gentlemen spent several weeks in collecting this and other small mollusca, making a trip of over a hundred miles, and they first called my attention to this *Vertigo*. It is decidedly different from *rugosula* in several points, and, as I have seen no intermediate forms so far, it may prove to be distinct.

* NAUTILUS III, p. 84.

Although in shape and apertural parts much like *V. ovata* Say, *ovulum* is quite distinct, but it should be compared carefully with *V. antivertigo* Drap., of Europe.

A NEW AMERICAN HELIX.

BY C. W. JOHNSON AND H. A. PILSBRY.

A collection of shells made during the past winter at Woodville, Jackson Co., Alabama, by Mr. H. E. Sargent, and submitted to us for determination, contains numerous specimens of a large Helix, which proves to be undescribed. The species is a member of the section *Triodopsis* but it does not exhibit the characters typical of that group, *i. e.*, a three-toothed aperture, but rather belongs in the neighborhood of the *Helix appressa* of Say, a species which lacks the upper lip tooth of *Triodopsis*. The new species may be described as follows:

H. Sargenti n. sp.

Shell depressed, imperforate, lens-shaped, carinated. Surface strongly rib-striate, the striation disappearing toward the center of the base; under a lens the surface between the rib-like striae is seen to be finely granulated. The aperture is wide, oblique; lip broadly reflexed, flattened, the basal lip bearing a long lamella, as in *H. appressa*. Upon the parietal wall there is a strong, high curved tooth, like that of *H. elevata* but longer. There are 6 whorls. The color is light russet above, paler or whitish below.

Alt. 11, diam. 24 mm.

Alt. 12, diam. 24 mm.

Alt. 9, diam. 22 mm.

This species differs from *H. appressa* in its larger size, stronger striation, the *granulated* instead of *spirally striate* microscopic sculpture, the strong carination, etc. It is allied in shape and sculpture to *H. carolinensis* Lea, but differs in totally lacking the upper lip tooth, in being flatter, more concave below, etc. The young shells differ markedly from young *H. appressa*, being flatter above, acutely carinated, and broadly umbilicated.

Figures will be published later, illustrating this unusually large and strongly characterized species.

Among other species Mr. Sargent found at Woodville the following interesting forms: *Patula cumberlandiana*, *Helix exoleta*, *H. stenotrema*, *H. spinosa*, *H. major*, *Zonites lævigatus*, *Z. gularis*, *Z. intertextus*, *Z. internus*, etc.

NOTE ON THE GROUP PANDA.

BY H. A. PILSBRY.

During the course of some studies upon certain Australian land shells, sent by the well-known conchologist Dr. J. C. Cox of Sydney, N. S. W., my attention was drawn to specimens of *Bulimus atomatus* Gray. Upon examining these shells under a lens, I at once noticed the minute sculpture and peculiar color-pattern characteristic of the two species hitherto included in the section PANDA,—*H. falconeri* Rve. and *H. maconelli* Rve. A consideration and comparison of the shells impresses me with the belief that *Panda* has heretofore been misunderstood and wrongly grouped. I am disposed to regard it now as a development from the *Bulimoid* branch of the *Helicidae*, instead of from the *Helicoid* stem. The diagnosis of *Panda* must be enlarged to include elongated forms, (*Bul. atomatus* and perhaps some other Australian species), but it will not require much change otherwise. The prominent features of the group, as far as the shell goes, are (1) the entirely simple, non-thickened, non-expanded lip, reflexed at the columella, (2) the sculpture of minute, close incised lines, and (3) the painting of fine close wavy brown lines on a yellowish ground. This last character is not invariable, for clear yellow examples of most if not all of the species occur.

The character of the lip and embryonic whorls separate *Panda* from *Helicophanta* and the other sections formerly grouped by me under the generic name Macroön. It will be noted that I formerly included it in that place with doubt, on account of these peculiarities.

OBITUARY.

THE ABBÉ PROVANCHER.

It is our painful duty to record the death, in his 72nd year, of the Abbé Léon Provancher, who for many years, despite great dis-

couragements and disadvantages, labored zealously and assiduously to develop and disseminate a knowledge of the natural history of Canada, and especially of his native province. He was born in 1820, at Becancour, Quebec, and for some years was Curé of Port-neuf, and one of his earliest entomological writings was a list of the Coleoptera of that district. Compelled by enfeebled health to relinquish the regular and more active duties of the ministry, he removed to Cap Rouge, near Quebec, and devoted his remaining time and strength almost entirely to the study of the natural sciences. In 1869 he commenced the publication of the *Naturaliste Canadien*, and notwithstanding many discouragements, completed in 1891 the 20th volume, when its issue was reluctantly abandoned, through the Quebec government refusing to continue the scanty annual grant it had received. In 1858 Provancher published an elementary treatise on botany and in 1862 his *Flore du Canada*. Subsequently he devoted his attention chiefly to entomology, and in 1874 commenced his *Faune Entomologique du Canada*, of which he completed three volumes.* Provancher was also, especially latterly, an enthusiastic conchologist, and as such became known by correspondence to many of the principal conchologists of the States. His last publication was a monographic illustrated treatise, *Les Mollusques de la Province de Quebec*, embodying the results of the author's researches in Canadian conchology.

The occasional inaccuracies of Provancher's conchological work will be excused when we consider the great disadvantages under which he labored. His death is a loss that will be felt long by the small band of Canadian Naturalists.

NEWS AND NOTES.

EDITOR OF NAUTILUS, Dear Sir: Thinking that the following extracts from a letter sent me a short time ago by a Western friend, would prove of interest to your readers, I take the liberty of offering them for publication.

The writer says: "I notice that much has been said in the NAUTILUS lately about the recent discovery of Unios having a byssus. In reference to this matter it would not be irrelevant for me to state

*See article by W. H. H. in the *Canadian Entomologist*, May, 1892, from which the preceding is taken.

that I found, nearly fifty years ago, *Unio lapillus*, Say, *fabalis* Lea, attached by a white, silk-like byssus to a fragment of an old shell. This fact I mentioned afterwards to John Bartlett, an old collector, whereupon he related to me the following story:

"A., a collector of shells, residing in Cincinnati, Ohio, and K., also a collector, residing in Cleveland, Ohio, were quite intimate. K. found the above mentioned species attached (as I did) by a byssus, whereupon he, K., wrote to A. at Cincinnati, stating the fact, and inviting him up to Cleveland, promising if he came, to go out with him and show him the wonder. A. was not long in responding to the invitation, and the two went out together and saw the shell attached by a byssus, sure enough.

"A. returned to Cincinnati soon afterwards and at once wrote to his London correspondent that he, A., had discovered a *Unio* attached by a byssus, and that he had invited his friend K., of Cleveland, to come down, and had taken him out to see the wonder.

"Soon after this K., being in correspondence, as it happened, with the same London party, wrote to him that he, K., had made this wonderful discovery in Cleveland, and had taken his Cincinnati friend out to see it. A., it seems, was ignorant of the fact that K. was in correspondence with the same London party, and so got himself inextricably trapped.

"My friend informed me that A. went by the name of 'Old Byssus' for a long time afterwards.

"So much for a lack of truth and candor. When the byssus was first discovered by myself, I, in my innocence of the facts just related, wrote to A. about it. He at once replied that it was not a new thing. It had been found before. I exchanged with A. quite a number of years after this and received some good things from him. Peace to his ashes! He is gone now, as are also most of the old collectors of Cincinnati."

These are the extracts and my only regret in sending them is the fact that I do not feel at liberty to give the name of the writer.

Very truly,

J. F.

DR. R. E. C. STEARNS, adjunct curator of the Department of Mollusks at the National Museum, has left Washington for the West Coast, for a season's rest.

MR. HENRY HEMPHILL will spend the summer in Idaho.

A. B. KENDIG, D. D. has changed his residence from 11 Hanson Place, Brooklyn, to 287 *Williams St., East Orange, N. Jersey.*

GEO. T. MARSTON has removed from Dupere, Wis., to Quincy, Illinois.

MR. FREDERICK STEARNS of Detroit, Michigan, who has been spending the winter in the Sandwich Islands, has sailed for Japan, where he will travel during the summer.

FRIEND PILSBRY: Will you not suggest in the NAUTILUS that any conchologist travelling about the country should make it a point to call upon his brother collectors, if he goes near their homes? I hope no member of the A. A. C. who comes to Boston, will fail to visit me at Revere, only six miles away. Surely introductions are unnecessary in our little circle.—*Edward W. Roper.*

We heartily endorse this suggestion, friend Roper!

EXCHANGES.

Exchange notices of moderate length will be inserted free for subscribers.

I HAVE SEVERAL hundred unusually fine specimens of *Limnæa megasoma* Say, to exchange for specimens of *Sphærium* and *Pisidium*.—*George T. Marston, care of State Savings Loan and Trust Co., Quincy, Ill.*

WANTED.—Marine univalves, especially of Mexico, Central and South America. Offered—many specimens, Marine, Land, and Fresh-Water, both U. S. and Foreign.—*C. Browne, Framingham, Mass.*

WANTED.—To Exchange Northern Alabama Land and Fresh-water Shells for shells from any other locality. Send lists and receive mine.—*H. E. Sargent, Woodville, Jackson Co., Ala.*

MARINE, Land and Fresh-water shells to exchange for a pair of good singing Canary birds. I will send my exchange list to any one that has such to exchange, or for shells that are not in my collection.—*Thomas Morgan, P. O. Box 164, Somerville, N. J.*

WANTED.—*Arca* and *Zonites*, from any locality, in exchange for British land and fresh-water shells.—*Robert Walton, Charles St., Lower Roxborough, Philadelphia, Pa.*

THE NAUTILUS.

VOL. VI.

JUNE, 1892.

No. 2.

THE SHELL BEARING MOLLUSCA OF MICHIGAN.

BY BRYANT WALKER, DETROIT, MICH.

In the ten years which have elapsed since the last catalogue of Michigan shells was published, many species have been added to the fauna of the State and our knowledge of the distribution of others has been very largely increased. While it is not probable that in the future the number of species will be largely added to, there yet is abundant opportunity for our local collectors to add to what must be admitted to be, on the whole, a meagre knowledge of the exact range of the different species within our borders. Every local list, carefully compiled, has its value; and if the publication of this paper shall, by its incompleteness, serve to provoke the publication of the information already in the possession of the different collectors scattered over the state, it will have accomplished not the least of the purposes of its compilation.

The first catalogue of Michigan shells was published by Dr. Abram Sagar, Zoologist of the Geological Survey, in 1839, and enumerated seventy-six species.

The second, by Dr. Manly Miles, State Zoologist, was published in the "Report of the Geological Survey for 1860."

The third was compiled in 1868 by Mr. A. O. Currier, of Grand Rapids, and was published as one of the "Miscellaneous Publications of the Kent Scientific Institute."

In 1879 the writer published a fourth list in the *Journal of Conchology*, Vol. 2, p. 325.

The fifth and last general catalogue was published in 1881 as "Miscellaneous Publication No. 5 of the Kent Scientific Institute," and was compiled by Dr. W. H. De Camp, of Grand Rapids. Dr. De Camp has very kindly furnished me with a manuscript continuation of his catalogue to December, 1891, and I have made frequent use of it for this paper. Species cited upon his authority and not included in his original paper as published, will be understood to be quoted from this supplement.

In 1859 Mr. Currier published a "List of the shells collected in the Grand River Valley," and in 1865, "A Catalogue of the Mollusca of Grand Rapids, Michigan." (*Am. Jour. of Conch.* I, p. 292.) As Mr. Currier's catalogue of 1868 undoubtedly embodied all his researches up to that time, the few particulars in which these earlier lists differ from it do not require special mention, and references hereafter made are to that publication.

In the "Report of the United States Fish Commission for 1872-3," Mr. Sidney I. Smith, in a "Sketch of the Invertebrate Fauna of Lake Superior," gives a list of the mollusks of that region which, while it is largely a compilation from the publications of Binney and Gould, includes the result of a series of dredgings made under the direction of the United States Lake Survey, and is especially valuable in showing the depths at which the various species were found.

Preliminary reports of the same dredgings are to be found in Vol. 2 of the "Report of the Secretary of War for 1871," and in the "*Am. Jour. of Sci. and Arts*" for December, 1871.

A local list of the species found near Ann Arbor, Washtenaw county, was published by Mr. C. E. Beecher and myself in the "Proceedings of the Ann Arbor Scientific Association for 1875-6."

In addition to these lists many scattered references to Michigan species occur in the *American Journal of Conchology* and in the various writings of Binney, Gould, Lea, Tryon, Prime, Conrad and Call.

In compiling the present catalogue I have endeavored to include every species which has at any time been cited as an inhabitant of the State. Where any such species is not represented in my own collection I have given the authority for the citation.

In addition to my own collections, which have been mostly made in the southeastern and northern portions of the state, I am indebted to Dr. W. H. De Camp and Mr. L. H. Streng, of Grand Rapids,

for many specimens from the western part of the state; to Dr. M. L. Leach, of Wexford, for a great deal of valuable material from the central and northern portions; and to Mr. Jerome Trombly, of Petersburg, for the local species of Monroe County.

Dr. V. Sterki has very kindly examined all the Pupidæ in my possession, so that there can be no question as to the species of this family so far as they are cited from my own collection.

It is greatly to be regretted that so little is known of the shells of the upper peninsula. It is practically a *terra incognita* to the conchologist. With the exception of Gould's citations in Agassiz's "Lake Superior" and S. I. Smith's paper above referred to, I have not been able to find any published information in regard to the fauna of that very important portion of the State. Some very inconsiderable collections from a few points along the St. Mary's river comprise all my personal knowledge in this particular.

As no localities are given as a rule in the earlier catalogues, it is impossible to say what information, if any, their compilers had on this subject.

In view of this condition of affairs it might have been better to have limited the title of this paper to the lower peninsula. As it is, however, it will be understood that unless otherwise specified, all remarks as to distribution are confined in that portion of the state south of the Straits of Mackinac.

Selenites concavus Say. Throughout the lower peninsula and probably further north, as it occurs at Lime Island in the St. Mary's river.

Vitrina limpida Gld. Traverse City and Lime Island in the St. Mary's river are the only localities yet recorded for this species.

Zonites fuliginosus Griff. Southern part of the State.

Z. ligerus Say. Not uncommon in the southern part of the State.

[*Z. inornatus* Say. Cited by Sagar and Miles, but does not appear to have been found by more recent collectors.]

Z. cellarius Mull. A few specimens were found several years ago in a green-house in Detroit.

Z. nitidus Mull. Abundant everywhere.

Z. arboreus Say. Abundant everywhere.

Z. radiatulus Alder. Common but not as abundant as *arboreus*.

Z. indentatus Say. Common everywhere.

Z. limatulus Wd. Cited by De Camp from Traverse City ; also by Miles and Currier.

Z. minusculus Binn. Generally distributed through the state.

Z. milium Mse. Islands in the St. Mary's river.

Z. binneyanus Mse. Cited by Binney from Tawas City. I have found it from Traverse City north to Lime Island. It is probably confined to the northern part of the state.

Z. ferreus Mse. Traverse City and Petoskey.

Z. exiguus Stimp. Generally distributed through the northern part of the State.

Z. fulvus Dr. Common everywhere.

Z. suppressus Say. Rare. Cited by Binney but does not appear in any of the catalogues. Dr. M. L. Leach sent me specimens from Fenton, Genessee County, a few years ago.

Z. multidentatus Say. Rare. Petoskey is the only locality known to me. Cited also by Currier and De Camp.

Patula alternata Say. Abundant everywhere.

P. alternata alba. This form occurred quite commonly with the type at Lime Island and Mackinac Island. Specimens from both localities exhibit all gradations from the typical coloring to the pure albino.

P. solitaria Say. An inhabitant of the southern portion of the state ; very rare in the southeastern part, where in some localities it is extinct ; more common in the western part.

P. perspectiva Say. Throughout the State.

P. striatella Anth. Common everywhere.

P. striatella alba. Mackinac Island is the only locality where I have found this form.

[*P. asteriscus* Mse. This species was cited in my catalogue of 1879 by mistake. I am not aware that it has yet been found in the state.]

P. lineata Say. Common everywhere.

P. harpa Say. Petoskey is the only locality thus far recorded.

Punctum pygmaeum minutissimum Lea. Appears to be generally distributed through the state, but is easily overlooked on account of its small size.

H. clausa Say. Cited by Sagar and Miles but not by any recent collector.

H. multilineata Say. Common in the southern part of the state.

H. multilineata alba. Associated with type but not common.

H. multilineata unicolor. Cited by Currier and De Camp.

H. thyroides Say. Common throughout the state.

H. thyroides bucculenta Gld. Cited by De Camp.

H. albolabris Say. Common everywhere.

H. albolabris dentata. Occurs occasionally with the type.

H. albolabris martima Pils. Traverse City. Specimens of this well marked form were sent to me by Dr. M. L. Leach, which appear to be identical with examples from New Jersey. It has been persistent in its present form for ages, as it is found unchanged in the marl-beds upon which the living specimens were found. Dr. Leach thus describes the habitat of the species: "The locality is limited, containing only a few acres on and around the marl-bed where their remains in connection with fluviatile shells are found in a fossil condition. I find only now and then one of the same variety anywhere else and that always not far away."

A single specimen collected by Dr. Leach at Black Lake, Presque Isle county, is probably referable to the same variety. This would indicate a range across the entire northern part of the lower peninsula.

H. exoleta Binn. Common in the southern part of the state.

H. elevata Say. Rare, if found at all in the state. The Grand Rapids collectors have not found it, nor have I. Cited by Sagar and Miles whose citations are followed in later catalogues. It occurs in recent deposits near Ann Arbor, but is now extinct there.

H. profunda Say. Occurs commonly through the southern part of the state.

H. profunda alba. Occasionally associated with the type.

H. sayii Binn. Cited in most of the catalogues but appears to be rare and confined to the northern part of the state. Black Lake, Presque Isle County, where it was collected by Dr. Leach, is the only locality I know of.

H. hirsuta Say. Common everywhere.

H. monodon Rack. Common everywhere.

H. monodon fraterna Say. Not as common as the type.

H. leaii Ward. Southern part of the state, common.

H. tridentata Say. Appears to be generally distributed through the state as it is cited in all catalogues.

H. fallax Say. More abundant than *tridentata*, judging from my own experience.

H. palliata Say. Probably throughout the state although I have seen no specimens from localities north of Gratiot County.

H. palliata alba. Cited by Currier.

H. inflecta Say. Southern part of the state.

H. pulchella Mull. Common in the southern part of the state. The costate form does not appear to have been found in the state as yet. It occurs on Put-in-Bay Island, Lake Erie, and no doubt will eventually be found within our borders.

H. labyrinthica Say. Everywhere in greater or less abundance.

Pupa fallax Say. Cited by Miles. Ann Arbor is the only locality from which I have it.

P. corticaria Say. Cited by De Camp from Kent County.

P. armifera Say. Southern part of the state.

P. contracta Say. Everywhere. Common.

Vertigo decora Gld. Cited by De Camp from Kent County.

V. ovata Say. Generally distributed over the state.

[*V. gouldii* Binn. Cited by Miles and De Camp. My own citation of 1879 was an error based on a specimen now referred to *tridentata*.]

V. bollesiana Mse. Very generally distributed through the state.

V. ventricosa Mse. Cited by De Camp from Kent County.

V. tridentata Wolf. Ann Arbor.

V. pentodon Say. Common.

V. curvidens Gld. Oakland and Macomb Counties.

V. edentula simplex Gld. Not common but ranges generally over the state.

V. milium Gld. Southern part of the state.

Ferussacia subcylindrica L. Generally distributed over the state.

Succinea aurea Lea. Cited by De Camp from Kent county.

S. avara Say. Abundant everywhere. Also cited as *S. vermeta* Say, by Miles, Currier and De Camp.

[*S. campestris* Say. Cited by Sagar, but evidently a mistake for *S. obliqua* which does not occur in his list. Miles gives *obliqua* but also gives *campestris*, probably quoting blindly from Sagar in this as in other instances.]

S. obliqua Say. Common all over the state.

S. ovalis Gld. Abundant everywhere. This species is occasionally infested by a species of *Leucochloridium* similar to the *L. paradoxum* Carus, found in the *S. putris* L. of Europe and figured by Baudon in Jour. de Conch. V. 27, pl. X, fig. 6. In the same

journal (V. 28, p. 205) is published a note from the late Thomas Bland, recording a similar occurrence in a specimen of *S. obliqua* Say.

S. ovalis decampii Tryon. Described originally from Marshall in this state.

S. ovalis peoriensis Wolf. A number of years ago, at the suggestion of Dr. James Lewis, I sent examples of a *Succinea*, common in this vicinity, to Mr. John Wolf, of Canton, Illinois, who identified them as a form he had named as above. I am not aware that a formal description has ever been published. It is a well marked form, easily separated from *ovalis*, and occurs abundantly in all parts of the state. It is closely allied to *S. decampii* Tryon and may be identical, but differs in color and lacks the black margin said to be characteristic of that species.

S. ovalis higginsii Bld. Specimens from Alpena received from Dr. W. A. Nason and said to have been identified by Dr. James Lewis, are the only ones I have seen from this state. The specimens referred to lack the parietal tooth supposed to be characteristic of the form.

(To be continued.)

LITTORAL LAND SHELLS OF NEW JERSEY.

BY WM. B. MARSHALL.

H. A. Pilsbry's list of shells, published under the above title, in the April NAUTILUS, is deficient by at least one species. In August, 1890, I collected one specimen of *Succinea avara* Say at Cape May, N. J. The exact locality was on the ocean front, at 8th Avenue, Mt. Vernon, between Cape May City and Cape May Point, and was not more than 200 feet from the line of high tide.

Mr. Pilsbry says, "The Atlantic shore of New Jersey is so sandy that few land snails find suitable conditions there." It is very true that land snails are very uncommon along the shore, but, in my opinion, their rarity is due to some cause other than the nature of the soil. The chalky dead shells of mollusks and crustaceans, which are abundant in the vicinity of the shore, furnish the snails a ready supply of lime; and the wild pea vines which grow in tangled masses, covering large areas of ground, afford a succulent article of diet.

PHYSA HETEROSTROPHA.

BY O. A. CRANDALL, SEDALIA, MO.

Is there such a species as that described by Say? If so, what is it? I am led to make this inquiry after a study of this genus for several years. The first question will of course be answered unanimously in the affirmative, but how many will agree as to the main characteristics of the species? I have examined during the last year many lots labelled *P. heterostropha* Say, and have not found two lots alike. They include all forms from the cylindrical *P. gyrina* Say, to the shouldered *P. ancillaria* Say, and have any number of whorls from three to six. Most of them were labelled by amateurs, who have no means of identifying the species except by following a rather meagre printed description; and it can hardly be expected that all should agree. Very few collectors have opportunity to see type specimens, and it is very annoying to have to send every "find" to some noted conchologist for identification. Besides, I find about as much diversity of opinion regarding *Physa* amongst our professors as amongst amateurs, hence, I write this article for the purpose of procuring a correct description of this species. Say describes the shell as "subovate, having four whorls, the first large, the others terminating rather abruptly in an acute apex; aperture large, somewhat oval, three-fourths the length of the shell, or rather more." These are the only characteristics given that are not common to many other shells. Binney, in "Land and Fresh Water Shells of N. A.," part 2, page 84, gives two figures: Fig. 144 from Say's type and Fig. 145 from Say's figure, which are about as near alike as a bean and a pea. Which shall we follow? The description is silent as to the form of the spire whorls and sutures, but from the fact that Fig. 144 shows convex whorls and impressed sutures, and from the other fact that Binney, after having seen the type specimen, placed in its synonymy *P. philippii* Kuster, *P. cylindrica* Newcomb, *P. fontana* Hald. and *P. plicata* De Kay, all of which have somewhat convex whorls and impressed sutures, it is fair to presume that these characters belong to the shell under consideration.

Add this presumption to the description given by Say, and we have a very fair description of what is generally considered one of our most common shells, and which ought to be easily identified by

any person who will hold strictly to the distinctive characters mentioned. But unfortunately Mr. Binney has placed *P. fontana*, having only *three* whorls, *P. plicata*, having *four to five* whorls, and two other species having *five* whorls each, and two species having flattened whorls, in the synonymy of this species, which has *four convex* whorls. There never can be a systematic classification of species until we cease to mix forms in this manner. The *number* and *form* of the whorls are the most reliable characters upon which a species can be based. It is one of the laws of nature that every animal, every bird and every insect, of the same species, builds its house in the same form. So the structures of every snail shell of the same species must be substantially the same as to texture, and number, and form of whorls. They may vary in color, height of spire, form of aperture and other characters that may be affected by accident or environment, but as to the structural form of its own skeleton it must follow its progenitors. So I conclude that every adult member of the same species must have the same number of whorls.

Coming back again to the main question. What is *Physa heterostropha* Say? It is a shell subovate in form, having *four* whorls, spire whorls *somewhat convex*, sutures *impressed*, spire elevated, terminating in an *acute* apex, aperture large and oval, but not inflated. The spire whorls are more convex than in *P. gyrina* Say and not so much as in *P. showalteri* Lea or *P. halei* Lea. It holds an intermediate place between the flattened and most convex whorls. It is never cylindrical, and the type is not inflated nor ventricose. Varieties may be slightly inflated but never so much as to resemble *P. vinosa* Gld. or *P. sayii* Tappan, which are frequently taken for this species.

If I am not correct, will some person who has seen the type specimen, revise and correct the description herein given?

NOTES ON THE NORTH AMERICAN SPECIES OF SUCCINEA.

BY T. D. A. COCKERELL.

For some time past I have been accumulating notes on the North American *Succineæ*, hoping to be able to classify them more pre-

cisely than has hitherto been done. As I have no longer time or opportunity for this work, I venture to put together the following notes, on the chance of their proving useful to other students. The genus is a most difficult one, and until someone will elaborately monograph the American species as Baudon has the French ones, we seem hardly likely to arrive at any satisfactory arrangement. With regard to the opinions given below, it is to be understood that they are nothing better than *opinions*, founded on the material examined. Further study with more abundant material would very likely cause some of them to be altered.

The American species of *Succinea* may be divided into four sections, three of which have received subgeneric names.

Sect. 1. *Amphibinæ*.

= *Amphibina* (Htm.) Mörch.

- (1.) *Succinea pfeifferi* Rossm. Many of the American forms of *ovalis* Gould are not to be separated from the European *pfeifferi*, while others, also hardly distinct from *ovalis*, might in the absence of intermediates be supposed to represent a peculiarly American species. The American forms of *Succinea*, both in this and other groups, are very closely allied, but at the same time seem more constant in their slight peculiarities than those of Europe. In *Ann. and Mag. of Nat. Hist.*, March, 1887, I referred *ovalis* to *pfeifferi*, and nothing since has appeared to prove otherwise.
- (1a.) *S. pfeifferi* var. *brevis* Pascal. This variety was originally called *brevis*, but afterwards unnecessarily changed by Baudon to *brevispirata*, because there is a *S. brevis* in Central America. I received a characteristic specimen, collected by Mr. D. B. Cockerell at Toronto, Canada. In shape, this variety is very like *S. higginsi*, and probably the two will be found to intergrade.
- (2.) *S. higginsi* Bland. Probably a variety or subspecies of *pfeifferi*, but a specimen marked *higginsi*, which I saw in the Binney and Bland Collection, at the American Museum of Natural History,¹ seemed to have affinity with *S. elegans*, while another in the same collection resembled *pfeifferi* very closely.

¹ I was much indebted to Mr. Sanderson Smith for his kindness in showing me this collection when I was in New York.

- (3.) *S. haleana* Lea. A specimen in the Binney and Bland Collection, from Alexandria, La., marked "*halei* Lea, type," seems to me to be specifically identical with *ovalis* Gould.
- (4.) *S. retusa* Lea. Said to be a variety or subspecies of *ovalis*, but so far as I was able to judge from a specimen in the Binney and Bland Collection, it is a valid species allied to *S. elegans*.
- (5.) *S. concordialis* Gould. Mr. J. A. Singley sent me this from Lee Co., Texas. It is allied to *pfeifferi*, but more pellucid and shiny; thin but rather strong; color, very pale horn. I have also seen a specimen in the Binney and Bland Collection.
- (6.) *S. forsheyi* Lea. A specimen in the Binney and Bland Collection is from Rutersville, Texas, the original locality. It is shiny and very near to *pfeifferi*.
- (7.) *S. nuttalliana* Lea. Mr. J. H. Thomson sent me five specimens collected in Wyoming in 1877, which no doubt belong to *nuttalliana*. They are shiny, with lines of growth well marked; in shape, like *pfeifferi*, varying towards *avara*; color, like *avara*. A specimen in the Binney and Bland Collection, from Portland, Oregon, is similar.
- (8.) *S. elegans* Risso. Mr. D. B. Cockerell sent me specimens found by rivers and streams at Toronto, which I could not distinguish specifically from the European *elegans*. At the same time, they are equally close to *S. haydeni* which may, I think, be considered a variety or subspecies of *elegans*. A specimen of *haydeni* in the Binney and Bland Collection tends to confirm this opinion.
- (9.) *S. hawkinsi* Baird. This I have not seen, but it is apparently very close to *elegans*.
(*To be continued.*)

GENERAL NOTES.

(In the July number of the NAUTILUS it is proposed to begin a series of articles upon the *collection* and *preservation* of shells. Notes bearing upon these subjects will be welcome.

"* * * While at Maldonado, Uruguay, I succeeded in finding *Helix costellata* D'Orb, under dead leaves in damp localities. While in the bay I procured about twenty dredgings with very good results, having at least three species of *Corbula*, and about fifty other

species of various genera. As we are to return to that place from time to time I will be enabled to add to them. The next few days I shall try to hunt up the *H. elevata* D'Orb, and the fresh-water species surrounding Montevideo.—*Dr. William H. Rush, in letter to Ed.*

HELICINA OCCULTA Say, has been re-discovered *living* in western Pennsylvania at Wildwood and at Cayuga, on the Allegheny River, Allegheny Co., by Mr. S. H. Stupakoff of Swissvale, Pa.

THE OLD, OLD STORY!—A number of fine pearls, some of them of considerable value, were found recently in mussel shells on the shoals in White river, near Seymour, Ind. One man realized \$75 from his find in a few weeks.—*Phila. Public Ledger.*

EXCHANGES.

(Exchange notices of moderate length will be inserted free for subscribers.)

CRETACEOUS AND EOCENE FOSSILS, minerals, agates, marine and fresh-water shells, to exchange for rare marine shells, cloth-bound books or agates.—*Homer Squyer, Mingusville, Mont.*

HERKIMER COUNTY LAND AND FRESH-WATER SHELLS to exchange for desirable species from other localities. Send lists and receive mine.—*Albert Bailey, Chepachet, N. Y.*

I HAVE SEVERAL hundred unusually fine specimens of *Limnæa megasoma* Say, to exchange for specimens of *Sphærium* and *Pisidium*.—*George T. Marston, care of State Savings Loan and Trust Co., Quincy, Ill.*

WANTED.—Marine univalves, especially of Mexico, Central and South America. Offered—many specimens, Marine, Land, and Fresh-Water, both U. S. and Foreign.—*C. Browne, Framingham, Mass.*

WANTED.—To Exchange Northern Alabama Land and Fresh-water Shells for shells from any other locality. Send lists and receive mine.—*H. E. Sargent, Woodville, Jackson Co., Ala.*

MARINE, Land and Fresh-water shells to exchange for a pair of good singing Canary birds. I will send my exchange list to any one that has such to exchange, or for shells that are not in my collection.—*Thomas Morgan, P. O. Box 164, Somerville, N. J.*

WANTED.—*Area* and *Zonites*, from any locality, in exchange for British land and fresh-water shells.—*Robert Walton, Charles St., Lower Roxborough, Philadelphia, Pa.*



WALKER, MOLLUSCA OF MICHIGAN.

THE NAUTILUS.

VOL. VI.

JULY, 1892.

No. 3.

SOME REMARKS ON NEW JERSEY COAST SHELLS.

BY JOHN FORD.*

Of the thousands of visitors to Atlantic City, Cape May and adjacent seaside towns, perhaps not one-tenth part give a thought to the myriads of living creatures other than human that sport in the surf, dally in the pools or hide in the sheltering sands. Yet it is not unlikely that the most superficial examination of these lowly forms would convince the observer that even seaside resorts may yield nobler pleasures than those of a physical nature only.

How many of these persons, I wonder, know that the despised Sea Nettles (Medusæ) often exhibit forms of surpassing beauty, rivaling in structure the most delicate of laces! And who of all the vast crowd think it worth while to note the wonderful variations in structure of the many species of crabs, shrimp, sandhoppers and other crustaceans dwelling between tides, and in some instances, in sands above the surf? Yet few if any phases of animal life, not even the transformation of a caterpillar to a butterfly, are as

* Editor of NAUTILUS,

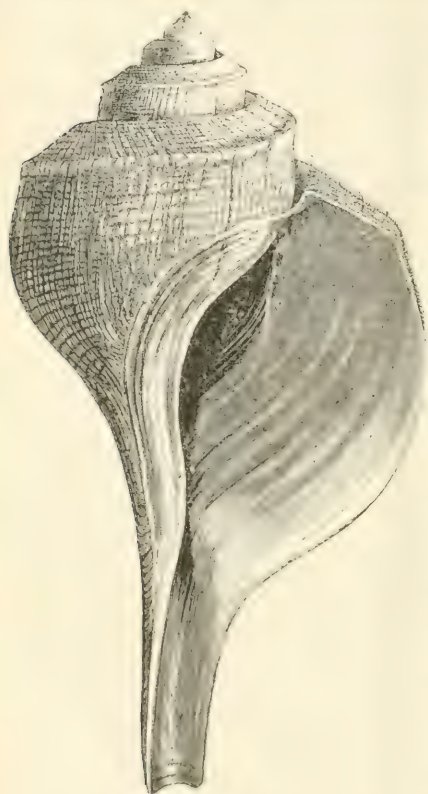
Dear Sir:

The thought has occurred to me that many of the NAUTILUS readers would be interested, now and then, in articles less technical and scientific than those usually presented in its columns. In order to test the matter I take the liberty of offering for insertion the subjoined chat regarding New Jersey Coast Mollusks and a few of their neighbors.

Very truly,

JOHN FORD.

remarkable as the periodic metamorphoses of certain species belonging to this order. Near the water's edge, when the tide is low, many other interesting creatures may be seen, including the sea anemones with their parti-colored crowns of tentacles; and pretty plant-like forms (Corallines) whose chief representative on the New

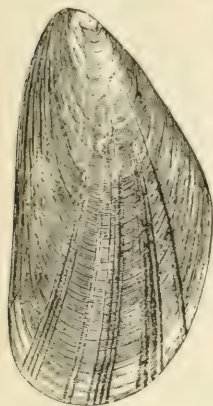


Fulgur canaliculata.

Jersey coast is the so-called fox or squirrel-tail *Sertularia argentea* Johnson. To most persons this appears to be an ordinary sea plant, but the careful student knows that in each of the tiny cells adorning the undried specimen, dwells one of the little architects and builders of the whole graceful structure.

None of these creatures, however, are more worthy of observation or study than are the native mollusks, reference to which is the chief purpose of this article. These dwell on the entire coast in countless numbers, but they are seldom exposed in quantity except by southeastern storms or gales which, striking the beach breast on, often tear up and carry large masses of sand with their unfortunate occupants beyond the reach of succeeding tides. It is not unusual for hundreds of tons of mollusks to be thus forced from their homes and left to die of starvation and exposure. Quite a number of the native species are edible. The first of these in the order of demand is, of course, the oyster, *Ostrea virginica*; next, the hard shell clam, *Venus mercenaria*; third, that precious favorite of all New York aldermen, the soft shell clam, *Mya arenaria*. He who has not eaten a dish of these on Coney Island beach

would be deemed by the said New York magnates a "very unfortunate man" indeed. Less delicate in flavor than the latter species are the common sea clams, *Mactra solidissima*, when not more than half grown. Sea mussels, *Mytilus edulis*, are also considered palatable though they are not very highly relished in this vicinity. In New York and New England, however, they are much esteemed by epicures.



Mytilus edulis var.
pellucidus.

Among the fishermen of Long Island Sound the large Conch, *Fulgur carica*, is often utilized for soup. But the writer knows by experience that this is not the kind of food a delicate palate will long for.

Another edible species, and one far more toothsome, is the little periwinkle, *Litorina litorea*, a species probably introduced from Europe. Until recently they were quite rare south of Raritan Bay, but at present a fine colony may be seen on the flats a little west of the Inlet House at Atlantic City. The pretty species, *Litorina irrorata*, a more southern form, also edible, appeared in large numbers on the bay side, near Longport, N. J., about three years ago, but the conditions surrounding them changed shortly afterward and the colony disappeared quite as quickly and mysteriously as it came. A few specimens may still be secured on the adjacent flats but they are much less perfect than were those of the colony referred to.



Litorina litorea.

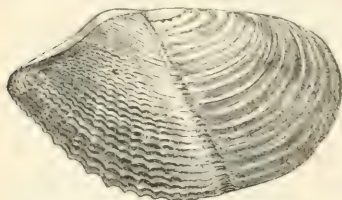
Many of the shells produced by the several species mentioned are well worthy of a niche in the collector's cabinet, especially so if taken alive and *in situ*. Otherwise the more recent additions to the lip-edges are apt to be injured by the action of the surf.



Litorina irrorata.

But there are hosts of other native shells besides those referred to, that may be profitably utilized by lovers of Nature's handiwork. Among the most prominent of these are the large pear-shaped Conch, *Fulgur canaliculata*; the several species of Pholades, including the largest known form, *Pholas costata*, which often secretes itself in the hardest limestone;

the canoe shells, *Modiola plicatula*; the razors, *Solen americanus* and *S. viridis*; the arks, *Arca pexata* and *A. transversa*; the boat shells, *Naticaheros* and *N. duplicata*; the cup and saucer shells, *Crepidula plana*, *C. fornicata* and *C. glauca*; the ladder shells, *Scala humphreysii* and (rarely) *S. lineata*; the scallops, *Pecten irradians*, the adductor muscles of which are largely used for food, thousands of gallons being sold annually by the coast fishermen. In addition to these there are several small species belonging to the genera *Columbella*,



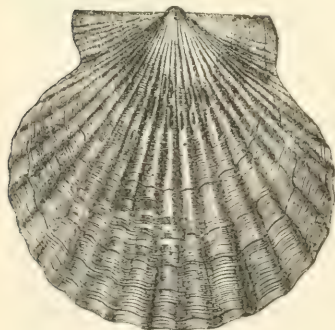
Pholas (Zirphæa) crispata.

Nassa and others, making the entire number living between Brigantine Inlet and Cape May about fifty species. At no special point, even on the most favorable occasions, can all of these be obtained. A large share, however, may at times be secured on the sea and bay shores near Longport, at Townsend's Inlet, Five Mile Beach and the Inlet two or three miles northeast of Cape May. But there is no locality known to the writer where species are so plentiful as at Anglesea; here, during a short visit last summer, thirty-nine species were secured by him.

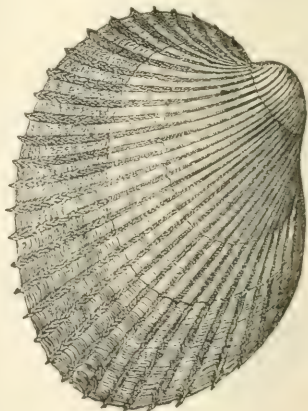
Nearly all of these were found living on a small peninsula about a half mile south of the Anglesea Hotel. *Fulgur carica*, the largest of our coast shells, were unusu-



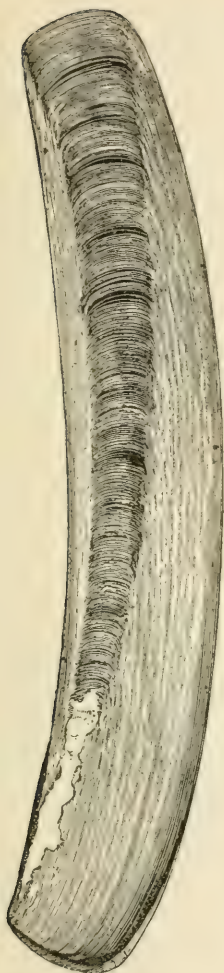
Scala Humphreysii.



Pecten irradians.



Arca pexata.



Solen americanus.

ally abundant, many of them being perfect in form, and exhibiting in the apertures the rarest shades of crimson, purple and orange. Excellent specimens of *Natica duplicata* were also found here *in situ*, these offering a new revelation to the collector as he saw, when lifting them from their beds, fine jets of water spouting in every direction from the edges of each large saucer-shaped foot. Both of these species were carried to the hotel and boiled—the former about ten minutes the latter two or three minutes. This made the removal of the animals an easy matter, leaving the lustre of the shells and color of the apertures uninjured. It should be remembered that the peninsula referred to is only free from water when the tide is nearing its lowest stage; also that the tide is low there at about the same hour it is high in Philadelphia.

In conclusion it may be well to inform the young collector that in the search for seashells at least three adjuncts are necessary—a trowel for digging purposes, a water-tight jar for preserving living specimens and a good sized basket for large shells. With these in hand, and a taste for the work, there is no reason in the world why he shouldn't be both successful and happy.

NOTES ON THE NORTH AMERICAN SPECIES OF SUCCINEA.

BY T. D. A. COCKERELL.

(Continued from last number.)

- (10.) *S. sillimani* Bland. This also may have to be united with *elegans*. Mr. L. B. Elliott sent me a specimen, pale horn

color, fragile and thin, collected at Denver, Colorado. There is a similar specimen in the Binney and Bland Collection.

- (11.) *S. salleana* Pfr. A specimen in the Binney and Bland Collection, from Alexandria, La., is white, and allied to *S. elegans*.
- (12.) *S. wilsoni* Lea. Mr. Singley sent me this from Brevard Co., Florida, and I make the following note: *pfeifferi* group; may be a good species; amber color, rather shiny, more obtuse and swollen than most *pfeifferi*. Agrees with Lea's description, but spire shorter than in his figure.
- (13.) *S. effusa* Shutt. A specimen in the Binney and Bland Collection is from Spring Garden Lake, Fla. A good species, allied to *pfeifferi*.

Sect. II. *Neritostomæ*.

= *Neritostoma* (Klein) Mörch.

- (14.) *S. putris* L. *S. obliqua* is generally not to be distinguished in anything from this. I found *putris* in 1887 close to the Cave of the Winds, at Niagara Falls. There is also a specimen from Niagara in the Binney and Bland Collection, marked *obliqua*. Mr. Singley sent me specimens of *obliqua*, collected in Carleton Co., Ontario, Canada. They approach *S. virescens* Jeffreys (non Morel.) rather than *putris*, the color being pale greenish-horn. One form, which may be considered typical, was 16 mill. long, spire 5½ mill. long, texture like *putris*. The other, which represented a variety, was 15 mill. long, spire 3½ mill. long—a more globose shell, which can probably not be separated from *S. virescens* Jeff., of Europe. Say's var. *ovalis* is very near to this.
- (15.) *S. totteniana* Lea. I received this from Mr. Singley, collected by Mr. E. W. Roper at Revere, Mass. It is, I think, a good species—an extreme form allied to *virescens*. Shell yellowish-green, inflated and thin, whorls rounded, mouth broad, spire short.
- (16.) *S. grosvenorii* Lea. Specimens from Lee Co., Texas, were kindly submitted to me by Mr. Singley. They comprised two forms, one greenish and the other, which may be called var. *rufescens*, reddish and more globose. The species is a good

deal like *putris*, but smallish and spire longer; whorls convex. It seems to be a good species. I have also seen it from Alexandria, La., in the Binney and Bland Collection.

- (17.) *S. stretchiana* Bland. I have seen this from San Francisco, Cal. (G. W. Michael), sent by Mr. Singley. It seems to be a small species of the *putris* group, allied to *S. parvula* Drouët, of Europe. Reddish-horn, not very shiny, striate, spire rather large. In the Binney and Bland Collection, one from Washoe Co., Nevada, looks rather like *avara*, at least in color; but another from Oregon is brown and resembles the *putris* group. There is a form *major* Ancey, ms. (sine descr.), nearly twice the size of the type, recorded by Yarrow, from Pagosa, Colo.

THE SHELL BEARING MOLLUSCA OF MICHIGAN.

BY BRYANT WALKER, DETROIT, MICH.

Carychium exiguum Say. Common everywhere.

C. exile H. C. Lea. Although not as common as *C. exiguum*, the localities where this form has been found indicate that it will be found generally distributed over the state.

Limnæa stagnalis L. Pl. I, fig. 6.

Occurs all over the State, often in great abundance. An extreme form, in which the body whorl is obtusely angulated, and the aperture much enlarged, from Houghton Lake, Roscommon County, is shown in fig. 6.

L. stagnalis jugularis Say. Pl. I, figs. 1, 2, 3.

I think this form is entitled to varietal rank. It is not as common as the typical form and seems to occur usually by itself. Figures 1, 2 and 3 from Black Lake, Presque Isle County, may be referred here; but the expansion of the lip, especially of fig. 1, is not typical, and is probably due to some peculiar local conditions. All the specimens from this locality are a pure translucent white. The *Physa fragilis* of Mighels is probably a similar case in another genus.

L. stagnalis sanctemariæ. Pl. I, figs. 4 and 5.

This form from the Neebish Rapids of the St. Mary's River is well characterized by its small size, and the flattening of the upper part of the body whorl, which gives a mammilliform appearance to the short, rapidly acuminate spire. The relative size of this variety and the typical *L. stagnalis* is shown by comparing figs. 4 and 5 with fig. 6.

L. ampla Migh. Houghton Lake, Roscommon County, is the only locality I know of for this species. Specimens from there, submitted to the late Dr. James Lewis, were so named by him. In the form in which it is found in Michigan, it seems doubtfully distinct from *L. emarginata* Say.

L. decollata Migh. Cited by Currier and DeCamp. I have with some hesitation referred specimens from Mullet Lake, Sheboygan County, to this form.

L. megasoma Say. Occurs in great abundance in the Higgins River, Roscommon County; also found at different localities in the St. Mary's River. It seems to be confined to the northern part of the state.

L. reflexa Say. Pl. I, fig. 8.

Generally distributed over the state, and as usual in the genus, exhibits a considerable degree of variability. In some forms it is difficult to distinguish from *L. palustris* Mull. *L. umbrosa* Say is cited by De Camp as distinct. Fig. 8 is a specimen with a remarkably expanded lip, from the River Rouge, Wayne County.

L. reflexa zebra Tryon. Occurs frequently, associated with the type, and is easily connected with it in any considerable number of specimens.

L. reflexa exilis Lea. The specimens on which the citation of this form in the catalogue of 1879 was based, are referred to the type by Mr. Pilsbry. They differ sufficiently from the large form usually found, as figured by Haldeman (Monograph pl. 8), although the whorls are not as flattened as the typical *exilis* from the Western States requires.

L. reflexa kirtlandiana Lea. This form is not entitled to more than varietal rank. Specimens from the original locality in Ohio agree very closely with examples from southern Michigan. Specimens from the St. Mary's River are more slender and more fragile, and are nearer to Utah examples received under this name from Mr. Hemphill.

L. reflexa scalaris. Pl. I, fig. 7.

Spire elongated, whorls rounded and suture deeply impressed. This form, which occurs occasionally, associated with the type, in the marshes at the mouth of the Rouge River, Wayne County, I cited without sufficient consideration, in my catalogue of 1879 as *var. distortus* Rossm.

L. columella Say. Southern part of the state but not abundant.

L. lanceata Gld. This may prove to be a form of *L. reflexa*. It is cited in all the catalogues, but I believe wholly because the original specimens came from the north shore of Lake Superior. Specimens from Belle Isle, Detroit River, are said by Pilsbry to be close to Gould's types in the Academy's collection.

L. palustris Mull. Found everywhere in great abundance and variety. A striped form similar to *L. reflexa zebra* is sometimes found. *Limnophysa fragilis* Linn., cited by De Camp, would seem to belong here. Dr. De Camp informs me that the *L. intertexta* of Currier, cited in his catalogue but never described, is a form of this species.

L. palustris michiganensis. Pl. I, figs. 9 and 10.

This form is similar to variety D, as figured by Haldeman in his Monograph pl. 6, fig. 7, but is much smaller, the length being but half an inch. It is very delicately striate and under the glass shows many very fine spiral lines cutting the striae. The aperture is just one-half the length of the shell. The lip is thickened by a rib within the inner margin, which shows itself as a white band on the outer surface. Spire acute, suture impressed, umbilicus small.

Haldeman's figure above cited, if reduced nearly one-half, would be an excellent representation of this variety; except that the whorls are more rounded and suture more deeply impressed than in this form. Figure 9 is from Ecorse and figure 10 from Greenfield, Wayne County. I am indebted for examples from Oregon to Mr. Pilsbry, who informs me that it ranges west from Michigan to Washington.

L. binneyi Tryon. Cited by De Camp from Houghton Lake.

L. haydeni Lea. Cited by De Camp from Houghton Lake.

L. traskii Tryon. Cited by De Camp from Newaygo County.

L. contracta Currier. Higgins Lake, Roscommon County is the only locality known for this curious form. It is either a semi-fossil, extinct species or an inhabitant of deep water, as only dead specimens have ever been found as I have been informed.

L. emarginata Say. A very abundant species through the northern part of the state and of great variety. Its most characteristic feature being a thick heavy shell, usually pure white and usually quite opaque, sometimes translucent. Specimens from Higgins Lake, Roscommon County, exhibit great variety in the form of the aperture which is frequently much expanded. Specimens from Sault St. Marie approach very close to Haldeman's figures of his *L. serrata* (Mon. pl. 2, fig. 6-8).

L. catascopium Say. An abundant and characteristic species of the Great Lakes, and their connecting rivers. Specimens from the north acquire the thick solid shell so common in *emarginata*.

L. caperata Say. Cited by Miles, Currier, Smith and De Camp.

L. cubensis Pfr. This form, hitherto known as *L. umbilicata* Ads., has a range over the whole of the State.

L. pallida Ad. Cited by Miles, Currier and De Camp.

L. desidiosa Say. Very common everywhere.

L. humilis Say. Very common and variable.

L. galbana Say (?) The form thus doubtfully designated, if not the living representative of Say's fossil species, has never been described. It has been found in Emmet, Grand Traverse, Alpena and Oakland Counties, and would thus seem to have a wide range through the state. It is a well marked form and seems to be subject to less variation than is usual in this genus.

L. bulimoides Lea. Cited by De Camp, "found in greenhouse, probably introduced by plants."

L. gracilis Jay. Reed's Lake, Kent County, is the only Michigan locality known for this species.

Physa lordi Baird. Northern part of the state. *P. parkeri* Currier, from Houghton Lake, is generally considered a synonym.

P. ancillaria Say. Generally distributed over the State, and exhibits a great degree of variability.

P. sayi Tapp. Very common. Cited by Currier and De Camp as *var. Warreniana* Lea. Specimens from a small pond near Traverse City, collected by Dr. Leach, are remarkable for the tenacity of the shell and the expansion of the outer lip. In some instances the newly formed lip was so thin as to be completely reflected back on the outside of the shell. Whether the local influences in this case were similar to those which, according to Prof. E. S. Morse, produced the *Physa fragilis* Mighels I cannot tell; but the two forms would seem to be identical.

P. vinosa Gld. Originally described from specimens collected on the north shore of Lake Superior, this species has been cited by Miles, Currier, Smith and De Camp without further knowledge of its occurrence. Recently, however, specimens from the Detroit River and St. Clair Flats have been referred to this form by Mr. R. E. C. Stearns, of the U. S. Nat. Museum.

P. anatina Lea. Although not cited from the western part of the state, its occurrence in Washtenaw, Macomb, Lapeer and Grand Traverse Counties show that it has a general distribution through the eastern and northern part of the state. Mr. R. E. C. Stearns, speaking of specimens from the Clinton River, Macomb County says: "Your specimens are the brightest and handsomest I have seen."

P. pomilia Con. Cited by De Camp as *var. Showalteri* Lea. I am indebted to Mr. Streng for specimens from Grand Rapids.

P. gyrina Say. Very abundant and in great variety of form.

P. gyrina hildrethiana Lea. Very common everywhere.

P. elliptica Lea. Cited by De Camp, as are also *P. oleacea* Tryon and *Febigeri* Lea, which are considered as synonyms by Tryon.

P. heterostrophia Say. Common everywhere and in almost infinite variety.

P. brevispira Lea. Specimens from the Detroit River have been identified as this species by Mr. Pilsbry.

P. deformis Currier. This species, originally described from Grand Rapids, is cited also by De Camp in his catalogue. Dr. De Camp writes: "I do not believe that this is a distinct species."

Aplexa hypnorum L. Common everywhere.

A. hypnorum tryoni Currier. Distinguished by its larger size and deeper coloring.

A. integra Hald. Generally distributed through the state and quite common. I follow Tryon in including Lea's *P. niagarensis* as a synonym. Mr. R. E. C. Stearns, however, informs me that our Michigan species is *niagarensis* and that Haldeman's *integra* is a southern species not extending further north than Indiana. The Michigan form agrees, however, with specimens received as *P. integra* from the late Dr. Jas. Lewis.

To be concluded.

GENERAL NOTES.

GONIOBASIS VIRGINICA IN CONN. The collection of the American Assn. of Conchologists has received specimens of the above species collected by Rev. Geo. D. Reid, from the Connecticut River, at Deep River, Conn. This is not far from the mouth of the river, and is, we believe, the eastermost locality reported for any species of this family in the United States. The specimens are large and well-developed, averaging over an inch in length. Both the smooth form and the spirally lirate var. *multilineata* occur.

MR. WILLIARD M. WOOD, of San Francisco, California, has gone on a collecting trip to Monterey Bay, where some new and rare species have recently been found. He will remain there during the month of July.

PLANORBIS MULTIVOLVIS.—I have lately received several specimens of *Planorbis multivolvus* Case, collected in the Island of Newfoundland, by a friend engaged on a surveying staff. They were found in the neighborhood of Brathurst Lake. I have not seen the Michigan form, but Mr. Bryant Walker, to whom I submitted my shells, tells me the Newfoundland specimens are "rather smaller and thinner but identical in form."—*W. J. Farrer, Orange, Va.*

EXCHANGES.

COLLECTORS who desire to dispose of North American Land, Fresh-water and Marine shells for those of *California*, will do well by sending their exchange lists to *Williard M. Wood, 2817 Clay Street, San Francisco, Cal.*

PACIFIC COAST, marine, land and fresh water shells, for land and fresh water shells of the West Indies and South America, *G. W. Lichtenthaler, Bloomington, Ills.*

FOSSILS from the Silurian, Devonian Sub-carboniferous and Carboniferous, to exchange for other fossils, especially of the Cretaceous and Tertiary; send lists and receive mine. *C. S. Hodgson, Albion, Ill.*

THE NAUTILUS.

VOL. VI.

AUGUST, 1892.

No. 4

COLLECTING NOTES.

BY CHAS. T. SIMPSON.

During a brief vacation last Christmas, Mr. John B. Henderson, Jr., of Washington, and the writer made a flying visit to the west coast of Florida, in the vicinity of Tampa Bay, for the purpose of collecting shells; and I have thought that perhaps a few notes on our work might be of interest to the readers of the NAUTILUS. The country throughout this region consists of ordinary sandy pine land, interspersed here and there with ponds and hammock or hardwood tracts of from an acre or so to several miles in extent. This region in general is one of the flattest on the globe, and as a consequence the sea is in most places quite shallow and thousands of acres of mud flats are often laid bare at very low tides or during "Norther's," affording wonderfully rich collecting grounds for the naturalist. We fitted ourselves out with a five or six ton sail-boat accompanied by a skipper and a good-natured cook, and with two weeks provisions, a gallon of alcohol, a dredge, and several large note books which were to be filled with original observations and discoveries, we sailed away as eager for adventures as Lord Bate-man.

I want to say to anyone who attempts to collect marine shells or animals, that first and foremost it is all important to use the dredge. This implement is so simple, so easily constructed, and is so efficient that the merest tyro never ought to try to get along without it. A full description of one and its mode of working can be found in Wood-

ward's Manual of Conchology, and one that brings the matter down to date will soon appear in a forthcoming paper by Dr. Dall on collecting. We threw overboard our dredge in the warm bright waters of Tampa Bay as the boat was brought up into the wind, and awaited results. There is a certain kind of excitement about the operation; the jar and tremble of the rope as the implement—far down out of sight—scrapes over the bottom, gathering in the treasures of the deep, produces a sensation akin to that which an angler feels when he gets a bite, or a sportsman when he sights game and “draws a bead.” And this feeling reaches a fever heat when the dredge is hoisted slowly, leaving a cloudy wake in the water, and its contents are dumped into the screen.

Starfishes, echini, perhaps a big horseshoe crab or two, and, mingled with living mollusks and fishes there may probably be dead shells inhabited by various forms of hermit crabs, fish, sea-worms and a dozen other kinds of life, many of which may be puzzling even to an experienced naturalist. There is something wonderful about all this, and entirely different from shore collecting; the animals are taken in their homes, caught in the very act of carrying on their ordinary avocations, and it is not to be wondered at that they seem to have a kind of surprised appearance when they are tumbled out indiscriminately on deck. There is always an element of uncertainty about dredging that furnishes a mild excitement akin to that of gambling. One throw, or a half dozen in succession, may turn out to be “water hauls,” bringing up nothing but mud or possibly sea urchins, and the “just once more before we go away” may bring up half a hundred species, some of them rare, and all desirable.

The vicinity of Tampa Bay is rich in marine species and is classic ground to the conchologist and the collector, it having been worked over by Agassiz, Conrad, Stimpson, Spinner, and other noted men who have passed on, and Drs. Stearns and Dall, Velie, Calkins, and others who are still with us; and often a run along the shores of some of the outer keys, or about the muddy, sandy bays, will reveal shells enough to turn the head of even a steady-going experienced conchologist. And at such times it always happens that when the collector gets every bucket, and sack, and basket, and both bands loaded down to the last limit with things that are good enough in all conscience, and is miles away from his boat, he begins to run upon numbers of such marvelously rare and beautiful things that

he is tempted to throw away every thing he already has and begin entirely anew.

Prof. Hornaday spoke the truth when he said that "the collector's life is a constant race for specimens." In the few brief days we had at our command we felt that we must "make hay while the sun shone." But dredging, though very delightful at first, when followed up for eight or ten hours consecutively gets to be a good deal like work, and hard, heavy, wet work too. So we did what I should advise all collectors in similar circumstances to do; we went ashore during low tides and searched sometimes the sandy bays, the limited areas of rocky shore to be found about that region, or the open beaches; and during high tide we dredged. One rocky bed laid bare at low tide in Terracina Bay was marvelously rich in *Tritonidea tineta*, *Cerithium floridanum*, *Semele reticulata*, *Murex nuxius*, *Cumingia tellinacea*, *Nassa consensa*, *Muricea multangula*, *Urosalpinx perrugatus*, and some other forms not often found on the sand.

Mrs. Mean's injunction "while yer a gittin' git a plenty" especially applies to the collector. One is prone when he sees anything in great abundance to feel as though it was very common and was hardly worth taking. Even the sight of a very rare mollusk in quantities somehow lowers its value in one's estimation. But the old collector who has let such chances go a few times, and afterwards where his entire stock of the same thing has run out, regrets his folly, learns to take all he can get of anything that is good. One may find a species thrown up to-day by millions on a certain shore, in excellent condition, and the next week, and for years afterwards, he may not run across a dozen individuals of the same. I had lived near Tampa Bay for four years and collected industriously, but throughout my whole residence I never found a hundred specimens of *Olivella mutica*, dead or alive. During our visit the dredge brought them up living, glittering like dew drops, by the handfuls. We dredged over and over the ground on which I once obtained in quantities of *Venericardia tridentata* and *flabella*, *Parastarte triquetra*, and *Pandora trilineata*, and scarcely found a specimen, while on the same ground we got a great many *Tubonillas*, an abundance of *Conus peali*, and a half bushel or more *Arca transversa*, not a specimen of which I had ever found there before; and on a sand flat that used to gladden my eyes with *Conus floridanus* not a single one could we find.

The shell mounds—the *Kitchen middens* of prehistoric tribes—are usually overgrown with tropical scrub, and are rich in land shells as well as mosquitoes and sand flies; and on one of these at Shaw's Point I rediscovered *Zonites dallianus* which I first found there three years ago, and, at the time, supposed to be the very different *Zonites minusculus*. In places the brackish water was swarming with *Cerithium minimum*, and *muscarium*, *Melampus coffea*, *Macoma constricta*, *Natica duplicata* and its companion *Melongena corona*, *Lucina Jamaicensis*, *Cerithidea scalariformis*, *Modiola plicatula*, var. *semicostata*, *Mytilus hamatus*, and the two *Cyrenas*, *floridana* and *carolinensis*. The ponds were alive with *Physa heterostropta* var. *pomilia*, *Succinea luteola*, which seems about as completely aquatic as any of the pond snails, *Planorbis tumidus*, which is a form of the protean and widely distributed *trivolis*; and on the keys several of the *Polygyras* were abundant.

Our ten days of collecting came to an end all too soon, for although we had worked very hard and gathered in some 200 species and perhaps 25,000 specimens, we had not had time to write a half dozen notes, and we had only made a beginning at what we wanted to accomplish. We packed our material and bid good-by reluctantly to the land of palmettoes, warm breezes and sparkling waters, carrying with us bright, happy memories that will only grow pleasanter as time passes away.

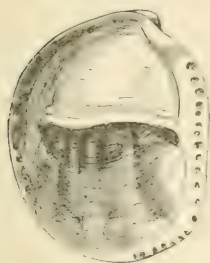
ON ATLANTIC CREPIDULAS.

BY WITMER STONE, PHILADELPHIA, PA.

During the summer of 1891 while at Cape May, N. J., I made a considerable collection of *Crepidulas* of all ages and varieties with a view to studying the relationship of the several species found on the New Jersey coast; and some of the possibilities suggested by an examination of this material may prove of interest.

We have on this portion of the Atlantic seaboard four nominal species, of which three, *C. fornicata*, *convexa* and *glauca*, grow upon the outside or convex surfaces of the shells upon which they occur,

while one, *C. plana*, grows upon the inside or concave surface. The curvature of the surface upon which the Crepidulas grow has naturally produced a similar curvature in their own shells as it would otherwise be impossible for them to retain their hold. We therefore find that the three species first mentioned are convex in shape, while *C. plana* is concave.



Crepidula fornicata.

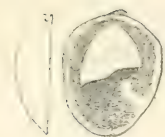
With this fact before us the question naturally arises: why is not *C. plana* a mere form of *C. fornicata* produced from eggs of the latter species which happened to be deposited on the inside of the host shell? A series of specimens collected with their hosts, however, shows that young *fornicata* is sometimes found on the inner or concave surface of *Natica* and *Fulgur* and retains all the characters of the species, being easily separated from the young of *plana*. The fact, however, that none but very small *fornicatas* are found in such positions, seems to show that the tendency to a convex form makes it impossible for them to retain their hold for any length of time on a concave surface. In other words, the tendency towards *convex* and *concave* shells has now become a fixed specific character.



Crepidula plana.

As to the original ancestry of *C. plana* there does not seem to me any doubt but that either this species has descended from a shell of the *C. fornicata* style or better perhaps that both species have developed from a free snail which formed the habit of attaching itself to other shells and whose characters have been gradually altered to suit its habits. Some of the individuals have thus adapted themselves to the convex and some to the concave surfaces of their hosts, and so eventually produced two distinct species. This theory is strengthened by studying the Crepidulas from other parts of the world, for my friend Mr. Pilsbry, tells me that on nearly every coast where a convex *Crepidula* is found there is also a concave species corresponding to our *C. plana*.

As regards our three convex Crepidulas, *C. glauca* and *C. convexa* are undoubtedly much more closely related to each other than either



Crepidula glauca.

is to *C. fornicata*, as has been already noticed by Mr. Pilsbry. In both of them the beak projects almost directly forward and stands clear above the margin, while in *C. fornicata* it is very much to one side and rests directly on the margin. This seems to be caused by the concentric additions to the shell being very unequal—i. e. wider on one side than on the other—in the latter species. The outline of the posterior margin of the “deck” or septum in *C. fornicata* is also different.

The difference between *C. glauca* and *convexa* is entirely one of shape and is apparently due primarily to the character of the surface on which they live, as *C. glauca* occurs on large shells where the curvature is slight and *C. convexa* on small, very convex shells such as *Nassa obsoleta*, where considerable curvature is necessary to enable the *Crepidula* to bring the entire margin of its shell in contact with the surface of its host.

Whether this difference of shape is to be regarded as a specific or subspecific character is a question dependent entirely upon the extent to which this adaptation to two styles of surface has proceeded. If shells of intermediate form occur, then *C. convexa* is merely a subspecies. Among those which I have thus far examined I have seen no intermediates.



The fact that we have at least two distinct convex *C. convexa*. *Crepidulas* upon the New Jersey coast naturally suggests the possibility that we may have had at one time, two concave species; one developed from the same stock as *C. fornicata*, as already described, and the other in a similar manner from the *C. glauca* stock. The similar environment and degenerate nature of “inside growers” would tend to obliterate the original specific differences, so that the two might easily have become merged into what we know as *C. plana*.

Anatomical investigations might throw additional light upon these questions, and a careful study of the genus will well repay anyone who has the requisite material at hand.

THE SHELL BEARING MOLLUSCA OF MICHIGAN.*

BY BRYANT WALKER.

U. anodontoides Lea. Cited by De Camp from Monroe County. Also by Call.

* The first installment (land mollusks) of Mr. Walker's catalogue of Michigan mollusks will be found in the June NAUTILUS; the second, aquatic gastropods, in the July number.

U. asperimus Lea. Cited by Miles, Currier and De Camp. The latter in a recent letter says: "I do not believe that it belongs to the State."

U. canadensis Lea. Three Mile Lake, Oakland County, identified by the late Dr. James Lewis.

U. cariosus Say. Cited by Sager and Miles; evidently an error, as the species does not occur so far west. The citation is probably based on some form of *U. occidentis* Lea.

U. cælatus Con. Cited by Sager and Miles. In all probability a case of mistaken identity.

U. circulus Lea. Common in southern part of the State. Specimens from the River Rouge are referred to *U. lens* Lea by Dr. De Camp.

U. coccineus Hild. Apparently quite common. A specimen from the Detroit River has a pink nacre.

U. complanatus Say. Northern part of the State. For an account of the re-discovery of this species in this State, see the NAUTILUS III, p. 16 and V, p. 93.

U. cornutus Bar. Cited by Currier and De Camp. Dr. De Camp writes me that this species, formerly common in the Grand River, has entirely disappeared.

U. cuneolus Lea. Cited by De Camp from Monroe County.

U. donaciformis Lea. Mouth of Otter Creek, Monroe County, collected by Jerome Trombly. Cited also by Call.

U. elegans Lea. Southern part of the State. Monroe and Kent counties.

U. ellipsis Lea. Detroit River and Grand Rapids.

U. ellipsiformis Con. The type specimens are stated by Conrad to have been received from Michigan. Were it not for the explicit statement that the beaks were simple, the figure and description would apply to *U. spatulatus* Lea. It would seem possible that it was described from specimens of that form in which the undulations of the beaks, usually quite light, had so nearly disappeared as to escape attention. The species has not been found by recent collectors.

U. fabalis Lea. The River Rouge near Detroit. Cited also by Sager and Miles.

U. gibbosus Bar. Abundant all over the State. A small variety is found in the Detroit river, in which the nacre varies from a deep purple to pure white. There is almost always, however, a trace of purple along the hinge.

U. glans Lea. The Clinton river at Pontiac, where it was first found many years ago, is the only locality known for this species in the State. Its occurrence there I have been successful in verifying.

U. gracilis Bar. Common. Specimens from the River Rouge, Wayne County, are the largest I have ever seen. Those from the Detroit River are much smaller, showing the unfavorable character of their surroundings.

U. iris Say. Cited by Sager, Miles, Currier and De Camp. The latter, however, in a recent letter queries whether the Michigan specimens can be distinguished from *U. novi-eboraci*. Call (Cat. Unionidæ Miss. Valley) credits the species to Michigan.

U. kirtlandianus Lea. Cited by Call from the Grande River (loc. cit.).

U. levissimus Lea. Cited by Miles, Currier and De Camp.

U. Leibii Lea. Detroit River, identified by Dr. Jas. Lewis; mouth of Otter Creek, Monroe County, collected by Jerome Trombly.

U. latecostatus Lea. Cited by De Camp from the Grand River, Kent County. A specimen received from him agrees in form and in arrangement of the folds with Lea's figure and description. It does not, however, seem to differ from *U. undulatus* except in the more highly developed character of the folds.

U. ligamentinus Lam. Southern part of the State. Cited also by De Camp as *U. crassus* Say. A form with pink nacre occurs on the Grand River (see Lewis, Am. Jour. of Con. IV, 81).

U. luteolus Lam. Very abundant everywhere and exceedingly variable in size, color and shape. De Camp cites *U. siliquoides* Bar., from Grand River as distinct. The nacre is occasionally more or less tinged with pink toward posterior portion.

U. multiradiatus Lea. Appears to occur generally through the southern part of the State. It is very abundant in the Huron River at Ann Arbor, Mich. A dwarfed form occurs in the Detroit River. The female has the edge of the mantle prolonged in long feelers, similar to those figured by Lea (Observations II, pl. xv, fig. 49) in the female of *U. radiatus* Lam.

U. nasutus Say. Occurs all over the State. Specimens from the Detroit River are small and quite thin.

U. negatus Lea. Sheawassee River, Genesee Co., where it was discovered by Dr. M. L. Leach, who writes that the only specimen he found was sent to the Philadelphia Academy of Natural Sciences and was there identified as this species. It is now in the museum

at Bay View, Petoskey, Michigan. Among a large lot of *U. rubiginosus* sent to me by Dr. Leach from the same locality was another specimen, which in the sulcate or rather heavily imbricated character of the surface resembles Lea's description of this species. It is, however, more inflated, and although somewhat eroded, lacks the peculiar beaks described by Lea. If not distinct, it certainly is a very peculiar form of *U. rubiginosus*.

U. novi-eboraci Lea. Abundant everywhere. A form without rays from this state was described as *U. opalinus* by Anthony, but is not considered as distinct by Lea in his last synopsis. Dr. De Camp sends me the following note on Anthony's species. "McNeil found the only specimen of this and sent it to Anthony. It was from Ottawa county, and McNeil says he thought it was a malformed *U. gibbosus* Bar. I have hunted the same stream and never found one."

U. occidentis Lea. Generally distributed through the southern part of the State.

U. parvus Bar. River Rouge, Wayne county.

U. penitus Con. Cited by Sager and Miles, probably a mistake as the species is a southern one.

U. plicatus Lea. Cited by Sager and Miles.

U. phaseolus Hild. Cited in most of the catalogues. Sheboygan County is the most northern locality known to me. Specimens from the Detroit river are smaller than usual, very strongly arcuate and darker colored without spots.

U. plicatus Les. Western part of the State, extending as far north as Muskegon. I have not found this form in the eastern part of the State. Michigan specimen seem to be smaller than those from more southern localities.

U. pressus Lea. Common all over the State.

U. pustulatus Lea. River Rouge, Wayne county.

U. pustulosus Lea. Cited by Sager, Miles and Call.

U. radiatus Lam. Cited by De Camp from Grayling, Crawford County, and as *U. distans* Anth. by Currier and De Camp. Were it not for the occurrence of *U. complantus* Sol., in the northern part of the State, (a species which is usually considered as confined to the Atlantic drainage), I should question whether there was not some mistake in the above citations. Gould in Agassiz "Lake Superior" however, cites this species from the north shore of that lake, and it is quite possible that it has extended from Canada into our northern

borders. I notice that in the NAUTILUS for November, 1891, p. 78, Mr. G. W. Dean says that Anthony's *distant* is the female form of *U. luteolus* Lam. Call (loc. cit.) also refers *U. distant* to *luteolus*. Lea, however, refers it to *radiatus*.

U. rangianus Lea. Fighting Island, Detroit river, and the River Raisin, Monroe Counties, are the only localities where this species has yet been found to my knowledge. Credited to Michigan by Call (loc. cit.)

U. rectus Lam. Not uncommon in the southern part of the State. A form from the Detroit river was described as *U. Sageri* by Conrad and another variety from the Huron river, Livingstone county, as *U. leprosus* by Miles. Specimens from the River Rouge, Wayne county, are fully as wide as any from the Ohio river, but longer, more compressed and not so heavy, the nacre being either white or purple. Detroit river specimens are only about half as large as Rouge river examples, with the nacre tinged with purple toward the hinge, or occasionally of a beautiful salmon color.

U. rubiginosus Lea. Common in the southern part of the State.

U. Schoolcraftii Lea. Not a common species, but cited in nearly all the lists.

U. spatulatus Lea. Very abundant in many localities.

U. subovatus Lea. Cited by Miles, Currier and De Camp. Specimens sent to correspondents as *U. ventricosus* Bar., have been referred by them to this form.

U. subrotundus Lea. Cited by Sager and Miles only. As it has not been found by later collectors it is to be considered a doubtful inhabitant of the state.

U. sulcatus Lea. Detroit river. Specimens from that locality were described as *U. perobliquus* by Conrad.

U. Tappanianus Lea. "Have this from Monroe County, Michigan, that agrees well with Lea's figure and description; but think it the same as *siliquoides*, only a variety of *luteolus*. The beaks are eroded on the specimens I have, so that I cannot decide well on the undulations"—De Camp. I know nothing of the occurrence of this species in the State, beyond the above note from Dr. De Camp, which seems to leave the identification somewhat in doubt.

U. tenuissimus Lea. Cited by De Camp from the Grande river. Also by Miles and Currier.

U. trigonus Lea. Cited by De Camp from Black Lake, Ottawa county; also by Miles and Currier.

U. triangularis Lea. Southern part of the State.

U. undulatus Bar. An abundant species in suitable localities in the southern part of the State. Dr. De Camp sends me a specimen which I think should be referred to this species, labelled *U. atrocostatus* with the following note: "This I found in Black Lake, Ottawa county, I think *plicatus* and *latecostatus* distinct; but would hardly say this of *atrocostatus* were it not for finding it only in the still water of the lake, while the other almost universally inhabits rivers with current."

U. ventricosus Bar. Very abundant all over the State and extremely variable. In many localities it attains a large size. Detroit river specimens are small and with comparatively thin shells.

U. verrucosus Bar. Southern part of the State.

(To be concluded.)

GOULD'S TYPES OF NASSA AND COLUMBELLA.

BY W. B. MARSHALL.

Tryon has expressed the belief that the types of several species of *Nassa* and *Columbella* described by Dr. A. A. Gould were destroyed in the Chicago fire.

Among others he mentions the following:—*Nassa beata*, Loo Choo Is.; *Nassa optata*, Sydney, N. S. W.; *Nassa spurca*, St. Simon's Bay; *Columbella minuscula*, Ousima; *Columbella zonata*, Kagosima.

Referring to the types of *Nassa*, Tryon said "Most of the above are from the collections of the North Pacific (U. S.) Exploring Expedition; they have not been figured and the type specimens were destroyed in the great Chicago fire. Some of them might be identified with other described species, but it is better not to do so. I think, under the circumstances.¹

In a note under his description of *Columbella* (*Seminella*) *minuscula*, Tryon said "Unknown to me. The types of this, the preceding and following species described by Gould are believed to have been destroyed at Chicago by fire."²

The types of the five species mentioned above were not destroyed. They are now in the collection of the New York State Museum at Albany and are represented as follows:—

¹ Manual of Conchology, (I) iv, p. 63.

² Ibid. v, p. 171.

Nassa beata by six specimens.

Nassa optata by one specimen.

Nassa spurca by four specimens.

Columbella minuscula by three specimens.

Columbella zonata by two specimens.

GENERAL NOTES.

ERRATA. For "*Helix sargenti*" in the May NAUTILUS, p. 8, read "H. SARGENTIANA J. & P."; the former name having been used for a species from the Bahamas, belonging to the section *Plagioptycha*.

Those familiar with the life work of the late Dr. Joseph Leidy will be interested to know that the two microscopes which he used for years and from which he obtained such valuable results have been placed in the hands of Messrs. Williams, Brown and Earle, Philadelphia, to sell, by Mrs. Joseph Leidy, and they will be pleased to show them to anyone desiring to see them. They were brought in 1875 and were in almost constant use down to the date of his death, and they show how careful a student he was, in that they are in perfect order and very little soiled or scratched.

The following extract from a letter to the Editor from Dr. W. H. Dall, written upon his recent return from the West Coast, will be of interest to our readers. * * * "My work this time was chiefly stratigraphical. I was able to determine the position of the Wallala beds as continuously conformable with, and below the upper Cretaceous Chico beds. Also to discover that earlier collectors have been mixing the genuine Pliocene and Postpliocene faunas in their collections, the two being often conformable, closely adjacent, and in similar mostly unconsolidated beds.

In mollusks I found that the *Periploma discus* and *Trophon triangulatus* have been found near San Pedro on several occasions lately. At Monterey I got several specimens of *Pedicularia californica* Newcomb, which lives on a red Gorgonian. Monterey as a collecting ground is already greatly injured, and will probably be nearly ruined before long, on account of the Hotel del Monte, the new town of Pacific Grove and the increased population of old Monterey, all the sewage of which is turned into the bay in front of the town. Beaches which formerly would afford several hundred species are now nearly bare, or offensive with stinking black mud. Old collectors will learn this with regret. The San Pedro collectors are very active and enthusiastic and doing good work."

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SHELL COLLECTING AT EASTPORT.

EDWARD W. ROPER.

The August number of the NAUTILUS was awaiting me on my return from a collecting trip to Eastport, Maine, with Messrs. B. H. Van Vleck and R. T. Jackson, of Boston, and I could fully appreciate Mr. Simpson's excellent article on dredging at Tampa Bay. Eastport is likewise "classic ground" to naturalists, and seldom a year passes that boatman Jerry Sullivan does not have an opportunity to take some ardent collector in his trim sloop. "Uncle" Jerry has been a resident of Eastport over forty years, and has coiled the dredge rope for Agassiz, Verrill, Fewkes and other well-known scientists. He knows the fluctuations of the strong tides, the depth of water, and what is of most consequence, the character of the bottom, which enables him to keep away from rocks which might cause the loss of the dredge.

While not equal to subtropical Florida as a collecting ground, Eastport, for a northern locality, is rich in species and individuals. Our dredgings were in water from fourteen to eighteen fathoms deep, and Mr. Simpson's statement that it was "hard, heavy, wet work," was certainly not overdrawn. Sometimes the dredge came up full of stones and gravel, with which were huge starfishes ten inches across the rays, curious leathery *Boltenias*, large red shrimps, sponges, such beautiful shells as *Trochus occidentalis*, *Margarita undulata* and *Admete viridula*, and perhaps the long-named

brachiopod, *Terebratulina septentrionalis*. The best brachiopod ground, however, has been ruined, by the dumping upon it of blue clay dredged from Luber Narrows.

The best hauls were made on a moderately soft bottom of mingled mud and sand, which was literally filled with dead and living shells of *Cylocardia borealis*, *Astarte undata*, *Astarte crebricostata*, *Cardium pinnulatum*, *Sipho pygmaeus*, *Dentalium striolatum* and many others. Here also were obtained numerous brittle stars, *Ophiopholis*, and the *Astrophyton Agassizii*, which came up clinging to the outside of the net, nearly as often as inside. When the dredge landed in soft mud it brought up such shells as *Leda tenuisulcata*, *Nucula tenuis*, *Crenella glandula*, *Yoldia sapotilla* and *Cryptodon Gouldii*.

Shore collecting at Eastport is sure to prove successful. Ordinary tides rise and fall eighteen feet, and at low tide a large area of shore is uncovered. *Purpura lapillus*, *Aemura testudinalis* and the various *Littorinas*, common all along the New England shore, are here of much larger size than in Massachusetts. *Buccinum undatum* is everywhere seen at low water mark, and bunches of its yellow egg cases are fastened to the rocks in abundance. Underneath stones are myriads of crawling things not well known to a conchologist, but nevertheless interesting. In the larger rock pools every stone hides specimens of *Chiton marmoreus* and *Chiton albus*, *Saxicava rugosa* and *Margarita helicina* are common and the bottom may fairly bristle with the spiny sea urchins.

The enthusiastic collector will understand my pleasure when a critical examination of my gathered treasures revealed about seventy-five species of shells, fifteen of which had not previously been represented in my cabinet. My companions, more interested in other invertebrate forms, were also quite successful. Add to this, the fact that we were in the coolest place in the country, wearing light overcoats many evenings while everybody at home was sweltering in torrid heat, and we may look back to our Eastport trip as favored by fortune and replete with pleasure.

AN IMPORTANT DISCOVERY—A NEW FOSSIL CYPRÆA.

JOHN H. CAMPBELL.

Mr. Homer Squyer of Mingusville, Montana, in collecting during the present summer, additional specimens of cretaceous mollusca in

the Fox Hills Group (upper Missouri) made an exceedingly important "find." Among the species found by him, was a *Cypræa* absolutely new to science, and which may turn out to be the oldest *Cypræa* known to be in existence. The two fossil cypræas from California (*Bayerquei* and *Matthewsonii*) and the *Cypræa* (Mortoni) from the New Jersey marl beds are the only species of the family published as belonging to the cretaceous period; and Prof. Whitfield of New York some time since found a cast of another species (to be described by him) in New Jersey, which he considers to be cretaceous. The stratum (*Tejon group*) in which the two California species were found, is now considered to be tertiary, and the two New Jersey species may possibly turn out to be tertiary also, and in that case, the species just found by Mr. Squyer would be the earliest species of the genus *Cypræa* known. Next month we will describe and figure it more particularly, as we have this month only space enough to note the fact of its discovery, and assign it provisionally a name which we suggest should be *Cypræa Squyerii*.

The type shell of the species (only perfect one found) has been forwarded by Mr. Squyer to the Collection of the American Association of Conchologists.

APPEARANCE OF AN ASIATIC ANODONTA IN THE CHINESE MARKETS OF SAN FRANCISCO.

BY WILLARD M. WOOD.

Several weeks ago, I was invited to take lunch at a Chinese restaurant, with Mr. Sue Locke, an interpreter.

While on the way, this gentleman, who knew I was greatly interested in the study of conchology, informed me that before going to the restaurant, he would show me a new shell which had just been brought from China. Upon this information, I questioned him, and found that it was a fresh-water species.

After passing through a number of narrow streets, we reached a very small Chinese merchandise store. The first object that attracted my attention, was a medium sized fresh-water aquarium containing a number of gold and silver fish.

Upon close examination, I found the bottom to be thickly lined with the species *Paludina Japonica* Mart., and two varieties of

same; and also a species of *Anodonta*, of which I have not, as yet, learned the name.

By my friend acting as interpreter, I discovered that but very few have been sent here. Upon the last steamer from China, several dozen were brought by the sailors, who disposed of them to Chinese merchandise dealers, in Chinatown.

I purchased a few at the price of fifteen cents apiece, and started for the restaurant; but we stopped on the way, once again, as my friend desired to take me to the home of one of his acquaintances to show me another species of *Anodonta*. I was very much astonished upon observing this specimen.

The shells I had been looking at were all less than three inches in length, while this specimen of another species, was almost six inches. I tried to secure it but failed. The Chinaman would not part with it. He said, "Me keepee. Him livee heep long time. No die."

As these shells may be bought exceedingly cheap in China, as I was informed, I shall try and have a number sent me.

NOTE ON CYTHEREA CONVEXA SAY.

BY W. H. DALL.

Quite a number of conchologists have referred to Conrad's statement (Medial Tert. Form.) that the well known name of our east coast species is preoccupied by Brongniart, but have hesitated to accept the name *Sayana* proposed by Conrad since no reference to chapter and verse was made by him to substantiate his observation. Having long sought the reference and at last found it, it seems well to put it on record. In Cuvier's "Ossements fossiles" volume II, pt. 2 contains an essay by Cuvier and Alex. Brongniart entitled "Essai sur la géographie minéralogique des environs de Paris." It contains 278 pages, 4to, with maps and copper plates and was published in 1811. A number of species are figured from the Paris basin, among them *Cytherea convexa*, pl. 8, fig. 7. This shell long remained doubtful but has been practically identified by Renevier and Deshayes with the *Cyrena semistrata* of Deshayes, described in 1831. Say's *C. convexa* was described early in 1824 (Journ. Acad. Nat. Sci. iv, 140). Another *Cytherea convexa* was described by

Hoffmann (Karsten, Arch. 1831, t. 3, p. 385) subsequent to that of Say. Owing to the slight tinge of doubt which still remained, Deshayes' specific has been universally retained for the *Cyrena* except by Herbert and Renevier (Foss. nummul. suppl. p. 59, 1854). All things considered it would seem best to adopt Conrad's name *Sayana* for the well known shell to which it has been applied and which extends its range from Prince Edward's Island to Indianola, Texas, and has existed unchanged since the Miocene.

HYALINIA LÆVIUSCULA N. SP.

BY DR. V. STERKI, NEW PHILADELPHIA, OHIO.

A few years ago while looking over a parcel of fine drift from the Guadalupe river, gathered at New Braunfels, Texas, I found a small *Hyalinia* which was evidently new; but upon the few specimens at hand I did not like to publish it. Now, a few weeks ago, Mr. J. A. Singley had the kindness of forwarding me several thousand small shells picked out of a lot of the same drift materials.¹ Among them there are several dozen specimens of this form, besides nearly as many *Hy. singleyana* Pils., hundreds of *Hy. minuscula* Binn. and a few *Hy. milium* Mse.

Our species is of the size and general appearance of *Hy. minuscula*, for which it doubtless has been taken, but differs from that species in being more depressed. The spire is entirely flat or very little elevated. The whorls are markedly wider, from the nucleus, in specimens of the same size $\frac{1}{2}$ –1 less in number, very gradually increasing, and flatter above and below. The surface appears smooth and polished, and only with a strong magnifier radiating lines are seen, much like those of *Hy. radiatula* Gray, but also proportionately much finer. The umbilicus is rather wider in the adult, and the curvature of the whorl to the umbilicus is quite abrupt, appearing almost angular. The shell is colorless, glossy while fresh, and when weathered, appears more milky white, while *minuscula* then is more chalky.

This form is certainly not a variety of *Hy. minuscula* which may be regarded as a "species" at the arbitration of a systematist, but

¹ They are so interesting that a list of them with some notes will be worth publishing in the "NAUTILUS."

entirely distinct. Although the differences from that species seem not striking at first sight, they are well marked after careful comparison, as anyone will be convinced by close examination of the two forms. *Hy. texana* resembles more *Hy. singleyana* Pils., which however is sufficiently different by its much smaller size. The two evidently represent a natural group, and doubtless will show peculiar anatomical characters. It is to be hoped that Mr. Singley or another Texan conchologist will succeed in securing fresh specimens for examination.

Since writing the above, specimens have been received from Hidalgo, Texas, and from Henry County, Indiana. It will probably be found at intermediate localities also.

OBSERVATIONS ON THE HELICES OF NEW ZEALAND.

BY HENRY A. PILSBRY.

The first species of New Zealand land snails made known to science were described many years ago, by Dr. J. E. Gray of the British Museum. A number of forms were described later by Pfeiffer; and most of these were illustrated by Reeve in his big volume on *Helix* in the *Conchologia Iconica*. Reeve took the liberty of renaming the species to which Pfeiffer had given the names of letters of the Greek alphabet. These changes have been adopted by some authors, but as they were wholly unwarranted the propriety of returning to the original Pfeifferian designation is now conceded by most students. The most elaborate contributions to our knowledge of the New Zealand land snails have been made by Prof. Hutton, whose work upon this fauna will only become the more highly valued and appreciated as the subject is more widely known and studied.

Mr. H. Suter has lately made very valuable and substantial additions to New Zealand Malacology. I am indebted to him for numerous specimens and drawings and much useful information still unpublished.

The most prominent element in the New Zealand *Helix* fauna is the ancient and widely distributed genus *PATULA*: this is represented by numerous small species belonging to the section *Charopa* of Albers. The world-wide distribution of this type of snail causes us to regard it

as a heritage from so early a fauna that the place of its origin and the paths of its distribution will probably never be known with certainty. There is a peculiar modification of *Patula* found only in New Zealand, to which Hutton has given the sectional name *Thera*.¹ New Zealand has also received Paluloid snails from the *Endodonta* stock, this group being a special development of *Patula* confined to Polynesia. The New Zealand members of the subgenus *Endodonta* belong to two groups of species, one of which contains *P. cryptobidens*, *P. timandra*, *P. jessica*; to the other group Mr. Suter has given the name *Maoriana*; these are minute discoidal forms having numerous folds within the aperture. This group can only be considered a mere section of *Endodonta*, the species being closely allied to minute forms of *Endodonta* found in New Caledonia, etc.

Another Helicoid genus represented by numerous species is *LAOMA* of Gray. This group is characterized by the small, thin, conical or depressed shell with thin simple lip. The jaw is composed of numerous separate squarish plates, being very much like that of our northern genus *Punctum*. The teeth also are peculiar; these composite jawed Helices are probably to be regarded as an excessively ancient and primitive type but their affinities are with *Patula* rather than with the so-called *Goniognatha*. No species known to belong to *Laoma* has been discovered outside of New Zealand. Hutton's genus *Phrixgnathus* must of course be united to *Laoma* but the name may be retained as a section to contain species without teeth in the aperture.

A third genus of New Zealand Helices is also, as far as we now know, confined to those Islands; this is the genus *GERONTIA* of Hutton. I use that name to comprise snails having the animal and dentition of *Patula* except that the tail is provided with a mucus gland. The jaw is thin and delicate and varies from striated to ribbed. The shell is thin, somewhat translucent and its surface is striated or ribbed, sometimes hairy or occasionally smooth. The spire varies from low conical to nearly flat; and it is a notable fact which has hitherto escaped observation that whatever be the sculpture of the mature shell, the apical or embryonic whorls are spirally striated. This is an unusual feature and recalls to my mind that strange Tasmanian *Helix*, *Anoglypta launcestonensis*. The snails

¹ The name *Thera* is already in use for a recognized genus of Geometric moths, dating from 1831. As a substitute, *Aeschrodomus* may be used. This section of *Patula* includes *H. alpha* Pfr. and *H. beta* Pfr., the first being the type.

of the genus thus defined have been distributed by New Zealand authors into the following groups which they regard as genera: *Gerontia* Hutt., *Therasia* Hutt., *Thalassia* Alb., *Pysra* Hutt., *Pyrria* Hutt., *Phenacohelix* Suter, *Patulopsis* Suter, *Amphidoxa* Alb. and *Calymna* Hutt. These sections or subgenera are founded upon various modifications of the shell or jaw, but they have not sufficient distinctness to rank as genera, unless we understand that term in a much more restricted sense than it has been used by the majority of conchologists or zoologists generally. These minor divisions are however natural groups and they are useful if we do not overestimate their importance. The sections or subgenera of this genus may stand as follows, the sequence of names being chronological.¹

Gerontia Hutt., 1883 (Type *G. pantherina* Hutton.)

Therasia Hutt., 1884, (Type *C. celinde* Gray.)

Calymna Hutt., 1884, + *Amphidoxa* Hutt. not Alb. (Type *C. costulata* Hutt.)

Pyrria Hutt., 1884, (Type *P. cressida* Hutt.)

Phenacohelix Suter, 1891 (Type *H. pilula* Rve.)

Allodiscus Pils., 1892 (Type *H. dimorpha* Pfr.).=*Pysra* Hutt., 1884, non Stal, 1876.

Suteria Pils. 1892 (Type *H. ide* Gray).=*Patulopsis* Suter, 1891, non Strebel, 1879.

Thalassohelix Pils. 1892 (Type *H. zelandiae* Gray).=*Thalassia* Hutton (? and of Albers, not *Thalassia* Chevrolat, 1834. (Coleopt.)

It will be noticed that *Amphidoxa* has been dropped or rather united to *Calymna*. The true *Amphidoxa* has not been found elsewhere than upon the island Juan Fernandez and the neighboring South American Coast. I have compared specimens with the New Zealand shells and find that there is not the slightest ground for supposing them congeneric. I am disposed to believe that the New Zealand *Thalassias* do not belong to the same genus as the Australian *subrugata* Pfr., the type of *Thalassia* Albers. The other departures from the usage of New Zealand authors are sufficiently explained in the above list.

¹ The genus *Phacussa* of Hutton is included by Suter. It may prove that the Zonitoid aspect of the dentition of that form is a secondary modification and not truly Zonitoid. In this case the group will be included among the present forms; otherwise it must remain in Zonitidæ, where Hutton placed it.

I will not comment here upon the genus *Carthaea* of Hutton; its affinities may be with the oriental *Bulimuli*, but certainly not with the South American group *Rhabdotus* where it has lately been placed.

In conclusion we find that the faunal relations of New Zealand as far as they are shown by the groups above considered are as follows: (1) with the primitive fauna of Australia still surviving in South Australia and Tasmania it is strongly allied by the predominance of *Patula* as well as of *Paryphanta*, *Rhytida*, etc., and also by the absence of the later elements of the Australian fauna, *Hadra*, *Chloritis*, *Papuina*, *Helicina*, etc., which are, as Mr. Hedley has shown, a recent influx from the Papua-Moluccan region. (2) from Polynesia it has received the *Endodonta*-like groups as well as probably *Tornatellina* and *Pupa*. The presence of *Placostylus* shows a third relationship to New Caledonia, Lord Howe Island and more anciently with the Solomon group, but this *Bulimoid* genus also extends eastward to the Vitian group.

With all deference to the opinions of such eminent zoologists as Prof. Hutton and Dr. von Ihering, I am unable to see that the New Zealand fauna is in any way allied to that of South America, except that in both the Old and the New worlds certain archaic forms have been preserved in these most southern extensions of land.

[COMMUNICATED.]

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

The Association has recently issued a new and revised list of members, under date of July 18, 1892. It contains the names of 175 persons, located in various points of the United States, Canada and Cuba and it is expected before a great while that the conchologists of Mexico, Central and South America, will also be enrolled.

The growth of the Association has been very gratifying and now that the officers have resumed active work, it will no doubt forge ahead very rapidly. The rule requiring the choice of some special subject or branch of conchology, has been a valuable one and a large body of trained specialists will shortly be the result.

It is suggested that it would be an interesting event, if the members would hold a convention at Chicago next summer during the

World's Fair. Doubtless most of the members will visit the Fair and if they could time their visits so as to meet their fellow members and hold a convention, it would enable them to become personally acquainted with each other, besides learning much from the eminent scientists among their number, through the medium of papers prepared for the occasion. The president would be glad to hear from the members upon the subject and if the idea is favorably received, a committee could be appointed to arrange a program. Send in your suggestions, ladies and gentlemen!

Another suggestion is made that a Committee be appointed to classify and revise the nomenclature of the American Unionidæ. Every one, who has paid any attention to this great family, is annoyed at the great number of synonyms that encumber the literature of the subject and as we have several members who are students of the Unionidæ, it would be a good idea to enlist their service in the work. What say you, Messrs. Simpson, Hargrave, Fry, Mead, Lehman, Monell, Nell, Strode, Trombley, the two Wrights, Whittemore, Wheeler, Shepherd, Marshall, Marsh, Gorby, Brady, Vaughan and Witter?

A word about naming shells. Some members like Prof. Dall, Ford, Simpson and Pilsbry are overworked, while others have little opportunity to help their fellow members. The trouble is that the gentlemen named and others like them are all amiable and would like to oblige everybody, but they have an enormous amount of work on hand, and it taxes their time too much to name large lots of miscellaneous shells, which could be distributed around among the members. The writer knows that they would protest against this, if they knew what we are saying about them, for they are too good natured to complain, but nevertheless we would make a suggestion to members, who desire their shells to be named properly. When you get a miscellaneous lot of shells, divide them first into univalves and bivalves. Then, if you can, separate them into land, fresh-water and marine, or as near as you can come to such a division.

Then take your list of members and turn to your index of subjects and find out who are studying the different branches. Then write and ask such specialists, if you will send your shells to them for naming and we venture to say, that they will gladly respond as that is one of the objects of the Association. Let us take a few instances.

1. If you are a beginner and do not know the genera, pick out one

of each genus as near as observation will permit and drop a postal card to the president and he will tell you to whom to send them.

2. If you are further advanced and want the species in any special families named, say *Strombidae* send to Mr. Ritchie, of Boston; say *Nassidae* to Mr. Browne, of Framingham, Mass; say *Pupidae* to Dr. Sterki, of Ohio; say *Olividae* to Mr. Ford, of Philadelphia; and so on to the end of your list and you can have your whole collection named in a few weeks. The only charge to you will be postage or expressage both ways.

3. If you have any advanced questions to solve, or names to discuss, or other knotty points, then write to men like Prof. Dall, Simpson, Stearns, Pilsbry, Binney, Cooper, Whittfield, Claypole, Schuchert, Sterki, Johnson, Lee, Keep, Yates, Marsh and many others. The Association has enough of trained specialists to answer almost any questions relating to conchology.

The collection of American shells being made by the members of the Association is already a wonderful success. The Academy of Natural Sciences of Philadelphia has given us every facility for caring for the specimens and there are already eight large museum cases almost filled by specimens sent by the members. There are about 1000 species already mounted and labelled and the specimens in most instances are superb, the senders generally taking a pride in sending only the finest shells that can be obtained. The placing of fossil species along with the recent ones adds especial value to the collection and makes it, so far as we know, the only zoological collection of the mollusca in America. It is already one of the finest special exhibits of natural history in America, and with the continued zeal and enthusiasm of the members, it is certain to be in a few years, the finest special exhibit in the world.

In sending shells for the collection, members should bear in mind. 1st. That none but members of the Association can contribute specimens. 2nd. None but fine specimens from definite localities will be accepted. 3rd. The exhibit is kept separate and apart from the general collection of the Academy of Natural Sciences. 4th. Every species is labelled with the name and locality of the shells, the name and exact address of the member sending it and the date when it is placed in the collection. 5th. Send all specimens intended for the collection addressed to the president of the Association, care of Academy of Natural Sciences, 19th and Race Sts.,

Philadelphia. He and his brother officers and some of the members assemble there once a week, open the packages, verify the names, label and mount the specimens and place them in the cases.

In the next issue of the NAUTILUS we will begin again the work of acknowledging the receipt of all shells sent during the month by the members.

EXCHANGES.

(Exchange notices of moderate length will be inserted free for subscribers.)

WANTED to exchange British and Tropical Mollusca for U. S. Mollusca of all kinds. Please send lists first and receive mine. None of the commonest species required.—*B. Tomlin, 59 Liverpool Road, Chester, Eng.*

WANTED, *Helices*, in exchange for land and fresh-water shells.—*Edw. G. Vanatta, 1608 N. 12th St., Philadelphia, Pa.*

WANTED.—Marine univalves, especially of Mexico, Central and South America. Offered—many specimens, Marine, Land, and Fresh-Water, both U. S. and Foreign.—*F. C. Browne, Framingham, Mass.*

COLLECTORS who desire to dispose of North American Land, Fresh-water and Marine shells for those of *California*, will do well by sending their exchange lists to *Williard M. Wood, 2817 Clay Street, San Francisco, Cal.*

PACIFIC COAST, marine, land and fresh water shells, for land and fresh water shells of the West Indies and South America, *G. W. Lichtenthaler, Bloomington, Ills.*

FOSSILS from the Silurian, Devonian Subcarboniferous and Carboniferous, to exchange for other fossils, especially of the Cretaceous and Tertiary; send lists and receive mine. *C. S. Hodgson, Albion, Ill.*

CRETACEOUS AND EOCENE FOSSILS, minerals, agates, marine and fresh water shells, to exchange for rare marine shells, cloth-bound books or agates. *Homer Squyer, Mingusville, Mont.*

HERKIMER COUNTY LAND AND FRESH-WATER SHELLS to exchange for desirable species from other localities. Send lists and receive mine. *Albert Baily, Chepachet, N. Y.*

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ON THE AMNICOLOID GENUS *LYOGYRUS*, WITH THE DESCRIPTION OF A NEW SPECIES.

BY HENRY A. PILSBRY.

Some years ago the writer had occasion to examine the dentition of the type species of Gill's genus *Lyogyrus*¹, and to show that it is not allied to *Valvata* as supposed by all earlier systematists, as well as by TRYON² and by FISCHER³; but that it is undoubtedly a member of the family *Amnicolidae* (*Hydrobiidae* of Fischer), and in fact, is not far removed from the genus *Amnicola*. The same results have been independently obtained and fully confirmed by Mr. Charles E. Beecher⁴ whose preparations and unpublished drawings of the radula of *Lyogyrus pupoides* show conclusively the true systematic position of this interesting genus.

Lyogyrus may be shortly described as a fresh-water Rissoïd having the shell of *Amnicola*⁵, the operculum of *Valvata* and the denti-

¹ Pilsbry, in the *Conchologists Exchange*, vol. ii, p. 113, 1888.

² *Structural and Systematic Conchology*, vol. ii, p. 274, 1883.

³ Manuel de *Conchyliologie*, p. 735, 1885.

⁴ Beecher in *MS. et litt.*

⁵ In some localities *L. pupoides* has the entire latter half of the body whorl free from the preceding whorl; but in the great majority of specimens this character is less marked than in the form originally described by Gould; and very often the peristome is actually in contact with the body-whorl for a short distance, as in a normal *Valvata*. The original *V. pupoides* is an exaggerated and extreme phase of a species varying much in degree of compactness. It is therefore obvious that the character of having the last whorl *free from the preceding whorl* is not a generic or even a constant specific characteristic.

tion of *Bythinella*. To the one species hitherto known we now add the following:

Lyogyrus dalli Pilsbry & Beecher, n. sp.

The shell is umbilicated, smooth, nearly lusterless, of a somewhat transparent horn color. In contour it is globose-turbinate with a short spire and decidedly obtuse apex. The $3\frac{1}{2}$ whorls are quite convex, separated by deep sutures; last whorl ventricose, being well rounded in every part. The aperture is somewhat oblique, almost circular, its posterior angle being indistinct and obtuse. The peristome is continuous and thin, not sinuous, not thickened nor expanded; but the inner lip is a trifle dilated, and adheres to the body-whorl above the umbilicus; the latter being a deep and rather widely open perforation.

Alt. 2.6, diam. 2.5 mm.

The operculum is usually retracted about the quarter of a volution within the mouth: it is a shining, yellowish, thin and corneous circular disk composed of many close whorls, the nucleus being subcentral.

The dentition is practically the same as in *L. pupoides*. The basal denticles are situated higher on the tooth than in *Amnicola*, and only one on each side is well developed, the outer denticle being more or less obsolete, but rather stronger in *L. dalli* than in *pupoides*.

Locality, Wekiva River, Fla. (C. E. Beecher).

This species was obtained in considerable numbers by Mr. Beecher in Wekiva River. It may be recognized by its globose contour, resembling the typical *Amnicola porata* of Say on a small scale; but it is more globose and has a wider umbilicus than any of our other *Amnicolas*. Of course a glance at the operculum (which is retained in the shell, as usual in this family), tells one at once that the shell is no *Amnicola*; for it is multispiral like the operculum of *Lyogyrus pupoides* Gld., the only species of the genus hitherto known. It will be remembered that Ancy described a *Lyogyrus lehnerti* some years ago, but this turns out to be a monstrosity of *Amnicola limosa* Say.

This species is named in honor of Dr. W. H. Dall, of the Smithsonian Institution, who has contributed so largely to our knowledge of the mollusks of Florida.

Illustrations of shell, operculum and dentition will be given in the Monograph of American *Amnicolidae*, now in preparation by Mr. Beecher and the writer.

A FEW ADDITIONAL NOTES ON CREPIDULA.

BY REV. HENRY W. WINKLEY, SACO, ME.

In the August NAUTILUS Mr. Witmer Stone makes the statement concerning *C. fornicata* and *C. plana* that "the tendency towards convex and concave shells has now become a fixed specific character" and the general description of *C. plana* grants to that species an existence on the interiors of other shells and a consequent concave form.

There is a colony of warm water shells in the waters of Northumberland Strait, between Prince Edward's Island and the province of New Brunswick, and this colony is of interest not only for the species which are so cut off from their fellows in the south, but also for a series of interesting Crepidulas. The writer has gathered many specimens of both *C. plana* and *C. fornicata*, but in no case was *C. plana* on the interior, and I recall no concave specimen of either. The specimens of *C. plana* were in some cases far more convex than the average *C. fornicata*. To one who has examined this colony the distinction between these species can have no help from convex or concave characters, yet both species are distinct, and while I have no doubt that they are from a common ancestor, it is impossible to count the dwelling place as responsible for the difference. May I also add that there is in my collection from the region named a specimen of *C. fornicata* which is white, yet bears undoubted characteristics of *C. fornicata*.

THE SHELL BEARING MOLLUSCA OF MICHIGAN.BY BRYANT WALKER, DETROIT, MICH.

Margaritana complanata Bar. Quite abundant and of large size in the Rouge river. Cited also by Currier and De Camp and no doubt occurs generally over the southern part of the State.

M. deltoidea Lea. Common all over the State. The small size, peculiar as usual to Detroit river specimens, is also characteristic of specimens from Put-in-Bay, Lake Erie.

M. Hildrethiana Lea. River Rouge, Wayne county. Cited also by De Camp from Monroe county, and without locality by Sager and Miles.

M. marginata Say. Common in the southern part of the State. The range toward the north of many of the species commonly met with in the lower portion of the State is quite unknown, and to be determined with any degree of accuracy will require a large amount of extensive and careful field work.

M. rugosa Bar. Common all over the lower peninsula, and sometimes attains considerable size. Detroit river specimens are smaller and thicker than those from the warmer waters of the interior of the State.

M. undulata Say. Cited by Sager, and, no doubt, erroneously.

Anodonta Benedictii Lea. Generally distributed. In the southern part of the State it often attains considerable size. Detroit river specimens as usual are smaller than the average.

A. corpulenta Coop. Cited by De Camp from Berlin, Ottawa county. Immature specimens from the Canal, at Grand Rapids, are referred to this species by Mr. W. B. Marshall.

A. decora Lea. *A. inornata* Anth., described from specimens from Slawson's Lake, Michigan, is referred to this species by Dr. Lea. Cited as *A. inornata* by Currier and De Camp; otherwise does not appear to have been found in the State.

A. edentula Say. Common everywhere and exceedingly variable in size, shape and color.

A. edentula rhombica Anth. This form, described by Anthony, is entitled to varietal rank; but can be too easily connected with the typical form to be considered specifically distinct.

A. ferruginea Lea. Cited by De Camp from the upper peninsula.

A. Ferussaciana Lea. Cited by Sager, Miles, Currier and De Camp.

A. Footiana Lea. Abundant everywhere and in great variety of form. *A. McNielii* of Anthony is considered synonymous by Lea.

A. fluviatilis Dillw. Cited by Miles; also by Sager and Miles, as *A. cataracta* Say. Cited by De Camp from Pentwater, and as *A. cataracta* Say, from the Grand river.

A. Footiana opalina Anth. A most beautiful form, well entitled to distinction as a color variety.

A. fragilis Lam. A very common species and in some of its many varieties one of our most beautiful ones. *A. flava*, *glandulosa*, *imbricata*, *irisans* and *pallida* of Anthony and *A. subcarinata* of Currier are considered as synonyms by Lea. I have no doubt but that some, at least, of these forms are entitled to varietal rank; but

have not sufficient authentic material to justify making such distinction at present.

A. imbecilis Say. Southern part of the State.

A. lacustris Lea. Cited by De Camp from the Grand River.

A. maryatana Lea. Cited as such by De Camp from Pentwater.

A. subinflata Anth., described from Michigan specimens and *A. Houghtonensis* Currier, from Houghton Lake, Roscommon County, where it still is found in abundance, are referred here as synonyms by Lea.

A. modesta Lea. Originally described from a specimen collected near Kalamazoo; this species has been found in other localities in the southern part of the State. It is closely related to *A. subcylindracea* Lea.

A. ovata Lea. Specimens referred to this species indicate a general range over the State. *A. subangulata* Anth. is considered synonymous by Lea.

A. pepiniana Lea. Cited by Miles. Also by Gould from the north shore of Lake Superior. I am indebted to Dr. De Camp for two specimens from Crooked Lake, Emmet County, which he refers to this species and which agree fairly with Lea's figure. They may, however, be young *A. Footiana*. Another specimen received from him, collected in Houghton Lake, Roscommon County, is probably a half-grown *A. Houghtonensis* Currier.

A. plana Lea. Southern part of the State. This is the largest Anodon we have, and attains considerable magnitude in favorable localities.

A. salmonia Lea. Southern part of the State. Specimens from Maple River, Clinton County, are much larger and heavier than those from Ohio.

A. Schaffneriana Lea. Cited by Miles, Currier and De Camp.

A. subcylindracea Lea. Common everywhere and very variable. Some forms seem to exhibit sufficiently persistent peculiarities to justify giving them varietal rank.

A. subgibbosa Anth. Originally described from Black Lake, Holland, Michigan. It also occurs in Mono and Muskegon Lakes at Muskegon, where it is not uncommon.

Sphaerium simile Say. Common all over the State.

S. aureum Prime. The types are supposed to have been brought from Lake Superior by the Agassiz expedition. Cited by De Camp from Charlevoix County.

S. solidulum Prime. Houghton Lake, Roscommon County; identified by Dr. James Lewis.

S. striatinum Lam. Very abundant everywhere and equally variable.

S. rhomboideum Say. Appears to be generally but not abundantly distributed through the southern part of the State.

S. fabale Prime. Not common but ranges over the State.

S. occidentale Prime. Quite common.

S. emarginatum Prime. The types are said to have come from the region of Lake Superior. Cited by Currier and De Camp; but apparently on the strength of Prime's statement.

S. flavum Prime. Types from Sault Ste. Marie. Cited by Currier ("Lake Superior") and De Camp.

S. partumeium Prime. Cited by Currier and De Camp from Lake Superior, apparently from the statement given by Prime in his original description. The citation from Houghton Lake in my catalogue of 1879, is erroneous, as the specimen does not agree with examples, supposed to be authentic, received from other localities.

S. sphaericum Anth. Grand Traverse County and Fenton, Michigan, identified by H. A. Pilsbry. Other examples from the latter locality are referred to *S. secure* by E. W. Roper (NAUTILUS, iv, p. 40).

S. transversum Say. Rouge River, Wayne County. Cited by De Camp from Grand River, Kent County.

S. secure Prime. Generally distributed through the State.

S. secure crocea Lewis. ' Traverse City; see Roper, NAUTILUS, iv, p. 40.

S. truncatum Lind. Generally distributed through the State.

S. vermontanum Prime. Cited by De Camp.

S. rosaceum Prime. Cited by De Camp.

S. stamineum Con. Western part of the State.

S. tenue Prime. Cited by De Camp.

Pisidium virginicum Bgt. Cited in all the lists and apparently distributed over the State.

P. adamsi Prime. Cited by Prime from Holly. Cited also by Currier and De Camp.

P. compressum Prime. Abundant everywhere.

P. abditum Hald. Common everywhere.

P. abditum abyssorum Stimp. Common in Lake Superior at a depth of from 4 to 159 fathoms according to Smith. Originally described from Lake Michigan specimens.

P. rotundatum Prime. "Lake Superior," Prime and Currier; cited also by De Camp.

P. variabile Prime. Apparently ranges over the State as I have it from Wayne, Washtenaw and Roscommon Counties. Cited also by De Camp.

P. ventricosum Prime. Cited by Miles and De Camp.

P. noveboracense Prime. Cited by De Camp from Cass County.

P. æquilaterale Prime. Detroit and Rouge Rivers, Wayne County.

OBSERVATIONS ON THE HELICOID GROUP CHAROPA AND ALLIED FORMS.

BY HENRY A. PILSBRY.

A striking illustration of the vast breadth of the intellectual horizon open before the zoologist is the fact that notwithstanding the large number of scientists, only comparatively rarely do two or several workers publish simultaneously and independently upon absolutely the same aspect or branch of the same special subject. When such a coincidence happened in the times of our predecessors it often gave rise to jealous rivalry, as in the case of Conrad and Lea, and earlier, Say, Rafinesque and Hildreth. In these newer days, cases of simultaneous discoveries in science should, and usually do, lead to an opposite result—to the most helpful and happy friendship and sympathy between naturalists, even though half the globe separates them.

These thoughts are brought to my mind by receiving, in the last Australian mail, proof-sheets of an article by my friend, Charles Hedley, of the Australian Museum, Sydney, N. S. W., entitled "Observations upon the Charopidae." In this article Mr. Hedley discusses many of the points considered in my "Observations on the Helices of New Zealand," published in the September NAUTILUS; and also extends his notes to the Australian and Polynesian forms. I cannot refrain from quoting from his paper these passages:

"Widespread throughout Australia and Polynesia is a group of land shells which, varying greatly among its members, yet appears clearly distinguishable from other orders by the small size of its species, their cancellated sculpture, in which stout ribs are a promi-

nent feature, flame painting, straight sharp peristome, which describes a convex then a concave sweep on approaching the right insertion, and a projecting semitransparent callus, which buries the sculpture of the whorl on which it encroaches. For this group I provisionally accept the title *Charopida*, assigned by Hutton, 1884 (Trans. N. Zealand Inst. xvi, p. 199), extending, however, the limits indicated by that writer. His vague diagnosis runs as follows: 'Animal heliciform with an external shell; tail with a mucus gland.' No type is nominated by the author of the family, and I therefore suggest that the type of *Charopida* would naturally be the genus *Charopa* Albers, whose type species is *C. coma* Gray."

Mr. Hedley proceeds to quote the original descriptions of the groups *Charopa* Alb., *Pitya* Beck, *Endodonta* Alb., *Libera* Garr., *Gerontia* Hutt., *Pyrha* Hutt., *Psyra* Hutt., *Therasia* Hutt., *Thera* Hutt., *Phacussa* Hutt.; mentioning also *Laoma* Gray, *Maoriana* Suter, *Simplicaria* Mouss.; concluding that "From the above review of the genera proposed, it will be seen that the student of the *Charopida* is better supplied with divisional names than with definitions." And finally: "To summarise: I would consider that *Patula* has no existence in the Pacific; that the southern species usually referred to that genus are not even of the *Helicidae* family; that these species can most conveniently be referred to one or other of the genera enumerated above, which genera may be grouped under the subfamily *Charopidae*, a division of the family *Zonitidae*."

It will be noticed that Hedley includes in *Charopida* most of the forms which in my article were placed as sections under *Patula* and *Gerontia*. The similarity of the shells of these two groups is remarkable, but the information furnished by Hutton upon the animals denied to the New Zealand *Patulæ*=*Charopa*, a mucus gland upon the tail, and therefore I did not feel justified in uniting the two groups, as I could see no reason for sundering *Charopa* from the genus *Patula*. If, however, *Charopa* and its allies, *Pitya*, *Endodonta*, etc., possess a mucus tail gland, I would unhesitatingly follow Hedley in his separation of *Charopa* from *Patula*, and in grouping it with *Gerontia* (*s. lat.*). Unfortunately only dried specimens are accessible to me, and the evidence furnished by authors is so conflicting that we may well suspend judgment. In the rank given to the group by Hedley I find myself unable to fully concur. The presence of a caudal gland and furrows along the foot margin are rarely if ever of more than generic importance.

Very closely allied genera vary in this respect, as in the case of *Arion*, *Ariolimax*, *Prophysaon*, *Anadenus*, *Anadenulus*, etc.; or in the case of *Cionella*, which has no mucus pore, and *Ferussacia*, which possesses this gland. It is hardly needful to multiply instances—the *Zonitidæ* and *Helicidæ* are full of such cases, although many of them are not yet to be found in the conchological text books. The fact seems to be that this caudal gland is simply a local exaggerated development, in a convenient place, of the mucus secreting, glandular structure to be found over nearly the whole upper surface of the foot; and it is likely to be developed independently in different groups. Its presence in different groups is, in my opinion, no proof of genetic connection. I would therefore retain *Charopa*, as well as the forms grouping around *Gerontia*, in the *Helicidæ*, on account of their dentition, which is not, it seems to me, in any respect *Zonitoid*.¹

The connecting links between *Charopa*, *Simplicaria*, *Pitys*, *Mao-riana*, *Endodonta* and *Libera* seem to be too numerous to allow us to regard these as separate genera; indeed, they are scarcely of subgeneric rank, unless the examination of the animal reveals differences more fundamental than those now known.

JAPANESE LIMPETS.

BY GEO. W. TAYLOR, VICTORIA, B. C.

The Japanese Patellidæ were tabulated by Mr. Pilsbry in the November number of the NAUTILUS and the table was reproduced with one slight alteration in the Manual of Conchology, vol. 13, p. 131, issued a couple of months later. Strangely enough, Mr. Pilsbry omits from his table in both instances one of the commonest species, namely, *Helcioniscus encosmius* Pilsbry.

A very fine series of this limpet was sent to me a short time since by the Rev. H. Loomis, of Yokohama, and I have also received it from Japan through Messrs W. H. Harrington and Frederick Stearns. The specimens sent by the last named gentlemen were

¹ Some recent authors speak of the "families" *Patulidæ*, *Trochomorphidæ*, *Cochlostylidæ*, etc. It would be well for them to attempt to give a family definition before using such terms.

labelled *amussitata* while genuine *amussitata* came as *toreuma*. I am by no means satisfied in my own mind, however, that the two last named are not one and the same species.

H. encosmius is a very distinct and easily recognized species and varies very little compared with other species of the genus. The figures in Reeve (Conch. Icon. pl. xvi, p. 36) are good and so are all those in the Manual of Conchology (vol. xiii, plate 71).

Mr. Pilsbry in the Manual points out that Reeve applied the name *P. variegata* to two different species. The first described in Conchologia Systematica which appears to equal *rota* of Gmelin and the other in Conchologia Iconica twelve years later, this last being the species Mr. Pilsbry now names *H. encosmius* on the ground that the name *variegata* is preoccupied by Blainville for an unidentified species from Botany Bay.

So far, so good, but Mr. Pilsbry next proceeds to quote as a synonym for his *encosmius*, *H. variegatus* Dall, Amer. Jour. of Conch., vi, p. 277, but this was Reeve's *first variegatus* = *rota* Gmel., as Dall himself surmised. Consequently Dall's localities (which Pilsbry has copied) are clearly incorrect when applied to *encosmius*.

My own impression is that the true *H. encosmius* Pilsbry (= *variegatus* Rve., Conch. Icon., pl. xvi, f. 36) is a species restricted to Japanese and Chinese waters, while the localities "Suez (Fischer) and Red Sea and Gulf of Akaba (Smithsonian Cabinet)," given by Dall and copied into the Manual are correct for *rota* Gmel. (= *variegatus* Rve., Conch. Syst. ii, pl. 136, p. 1).

The remaining locality given in the Manual, viz., "Australia" (Rve.), is also, I think, an error, although I have received from dealers specimens of *encosmius* which they assured me had come from there.

I should have mentioned above that although Dr. Dall in his paper in the American Journal of Conchology is writing evidently of *rota*, not of *encosmius*, he quotes *both* of Reeve's figures as though referring to the same species.

[COMMUNICATED.]

AMERICAN ASSOCIATION OF CONCHOLOGISTS.

PHILADELPHIA, Sept. 28, 1892.

Since the publication of the list of members, there have been admitted to the Association, the following new members:

Mrs. Anita F. Douredoure, 2203 Spring Garden St., Philadelphia, Pa. Subject—*Cypræidæ*.

Miss E. H. Pitman, Box 295, Bristol, R. I. Subject—*Mollusca of New England*.

John W. Palmer, Union League Club, Chicago, Ill. Subject—(not chosen yet).

Warren W. Herman, 149 Emerson St., Boston, Mass. Subject—(not chosen yet).

Wm. H. Weeks, Jr., of Brooklyn, N. Y. has chosen for his subject of special study, the genus *Bulinus*.

In reference to the suggestion of a Convention of the members to be held at Chicago next summer, there have been but few responses as yet. The idea, however, will probably grow, and the members may become interested in it. It is merely a suggestion as yet and of course, will amount to nothing unless the majority of members think it a good thing. Let us hear from the members.

John H. Thomson of New Bedford, Mass., writes: "I like the suggestion of a Congress of Conchologists at the World's Fair next year."

Dr. W. S. Strode is in full accord with the idea as may be seen from the following letter:

LEWISTOWN, Ill., Sept. 7, 1892.

JOHN H. CAMPBELL, ESQ.

Dear Sir.—Your idea suggested in last NAUTILUS to have a Convention during the World's Fair of the "Amer. Asso. Conchologists" is just the thing. I am heartily in favor of it and think it would double the pleasure of a visit to Chicago, at least in my case, to meet the Conchologists face to face, and form an acquaintance that has been hitherto only on paper. Let's have it by all means and then thoroughly discuss, review and possibly revise our loved shells. If this can be done, I would not miss going to the World's Fair, for anything.

Yours truly,

W. S. STRODE.

Mrs. M. Burton Williamson, of University P. O., Cal., has prepared and published (by Smithsonian Institution) "An Annotated List of the Shells of San Pedro Bay and Vicinity." It is a valuable list and highly creditable to the author. We have had occasion already, to use it in connection with the collection of the Amer. Association and find it of the greatest value. Several new species of Prof. Dall's are described and figured.

Want of space in this issue of the NAUTILUS will postpone the publication until next month of the acknowledgment of shells received for the "American Collection."

The officers of the Association would like to hear from the members in reference to the purposes, objects and workings of the Association. Suggestions are always received with much pleasure as it aids them in their work. A short resumé of work performed during the past summer by each member would make an interesting article in next NAUTILUS, and we have no doubt that Messrs. Pilsbry and Johnson will gladly throw open its columns for that purpose, as they have already done for this series of articles on the Association.

J. H. C.

NOTES AND NEWS.

ERRATA. In the September NAUTILUS, p. 54, in fourth line from top, read "*leviuscula*" in place of "*texana*." There is no *H. texana*.

THE UNIONIDÆ of Spoon River, Fulton Co., Ia., are enumerated and intelligently discussed by Dr. W. S. Strode in the *American Naturalist* for June.

EDITOR NAUTILUS:—I see that in Mr. Cockerell's article in the July number, page 31, "Notes on the North American Species of Succinea," he says, "(17) *S. stretchiana* Bland. I have seen this from *San Francisco, Cal.* (G. W. Michael), sent by Mr. Singley. It seems to be a small species, etc."

During the seven years that I have been collecting in this county I have never found nor have I heard of the above species being found here. The only Succinea to be found in this county, to my knowledge, is *S. oregonensis*. If Mr. Michael or Mr. Singley have any of the said species to spare, will they kindly send to my address a few of them for examination and comparison as also the exact locality whence they were obtained and oblige. I doubt whether Dr. J. G. Cooper and Wm. J. Raymond, two gentlemen who have collected species from this county during the past fifteen years or so have ever found *S. stretchiana* Bld. here.

Yours truly,

Williard M. Wood.

THE NAUTILUS.

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No. 7

CATALOGUE OF THE GENUS *PARTULA*.

BY W. D. HARTMAN, M. D.

In the following pages is offered an arrangement of the species of the genus *Partula* into groups according to their natural affinities. The number now known is nearly a hundred species. Specimens of nearly all of which I have personally examined, either in my own collection, in the magnificent collection of HARPER PEAKE, or in the museums of Paris, Geneva, etc. A description of the animal is also given.

In the next paper the geographical distribution of the leading forms will be discussed.

The animal is terrestrial and viviparous, the body covered by a mantle as in *Helix*, blunt before, tail long and gradually tapering. Tentacles four, retractile, the upper having the eyes at their tips, collar and labial processes largely developed, no mucous pore, distinct locomotive disc, or parallel furrows alongside of the foot; anal and respiratory orifices in the collar opening on the exterior angle of the shell; organs of generation united, the orifice behind and below the right eye peduncle, matrix ample and occupying much space in the body cavity, often containing several shells of two or three whorls, beside eggs arranged in succession as developed. The embryo shells exhibit spiral rows of fovea beginning at the apex, which after extrusion are continued as spiral striæ. The jaw is very transparent and of a light horn color, slightly arcuate, and more or less attenuated at the ends; the whole anterior surface of the jaw is furnished

with delicate narrow, separated ribs which break the continuity of either margin and run obliquely to the median line where they form a triangular space of ribs of unequal length, which do not reach the lower margin; the number of ribs on each side of the median line, vary in the same species, as well as in the different species, the whole number in each jaw varying from fifty-five to ninety-six; the lingual membrane is broad and the denticles vary in size in the different species some being narrower than others. Shell dextral or sinistral, varying from oblong ovate, to conic ovate, and from solid to thin and translucent or hyaline. Labium often flat, and widely reflected, occasionally revolute or concave, aperture ovate, or auriform, more or less contracted by the wide and often dentate columella. Surface with minute spiral striæ which are punctulate at the apex.

This genus may conveniently be divided into two subgenera: *Partula* (in the restricted sense) and *Diplomorpha*. The species of true *Partula* I divide into two divisions and thirteen groups, each of which is named for a characteristic species.

I. AURIFORM DIVISION.

1. Faba Group.



P. faba.

P. faba Martyn.
P. citrina Pse.
P. vittata Pse.
P. radiata Pse.

P. navigatoria Pfr.
P. planilabra Pse.
P. fusca Pse.

2. Auriculata Group.



P. auriculata.

P. auriculata Brod.
P. compacta Pse.
P. thala Garrett.
P. bilineata Pease.

3. Dentifera Group.



P. dentifera.

P. dentifera Pfr.
P. formosa Pse.
P. califera Pfr.
P. imperforata Pse., MS.
P. virginea Pse., MS.

4. Lutea Group.

*P. lutea.**P. lutea* Lesson.

5. Umbilicata Group.

*P. umbilicata.**P. umbilicata* Pse.*P. gibba* Pfr.*P. bicolor* Pse.*P. gibba.**P. hebe.**P. crassilabris* Pse.*P. hebe* Pfr.

6. Otaheitana Group.

*P. otaheitana.**P. otaheitana* Brug.*P. vanikorensis* Q. & G.*P. mooreana* Hartm.*P. lineata* Less.*P. suturalis* Pfr.*P. garrettii* Pse.*P. lignaria* Pse.*P. producta* Pse.*P. nodosa* Pfr.*P. stolidia* Pse.*P. filosa* Pfr.

7. Tæniate Group.

*P. carteriensis.**P. tæniata* Mörch.*P. micans* Pfr.*P. carteriensis* Q. & G.*P. attenuata* Pse.*P. cinerea* Albers.*P. minima* Hartm.*P. regularis* Hartm.*P. micans* Hartm.*P. corneola* Hartm.*P. woodlarkiana* Hartm.*P. hastula* Hartm.*P. clara* Pfr.*P. hyalina* Mod.*P. Hartmani* Smith.*P. flexuosa* Hartm.

<i>P. lyrata</i> Mouss.	<i>P. concinna</i> Pse.
<i>P. lævigata</i> Pfr.	<i>P. Coxi</i> Angas.
<i>P. pellucida</i> Pse.	<i>P. kubaryi</i> Hartm.
<i>P. simulans</i> Hartm.	<i>P. pellucida</i> Pse.

(To be concluded.)

ANNOTATED LIST OF ALABAMA LAND MOLLUSCA.

BY F. E. SARGENT, WOODVILLE, ALA.

Those familiar with the scarcity of land mollusca in the northern prairie States will appreciate the pleasure which one experiences in coming from Minnesota to Northern Alabama.

With headquarters upon the top of Cumberland Mountain in Jackson Co., it has been my pleasure during the past five months to do some collecting of land mollusca, the result of which may be of interest. The topography of the region is quite varied. The summit of the mountain is comparatively level, rather sandy and covered with timber. About half way down we come to the "benches" which are covered with lime-rocks. In most cases the flat rocks are piled one upon another forming excellent retreats for the smaller forms. At the foot of the mountain the "coves" are level and in places covered with heavy open timber.

The following list is doubtless far from complete, as but a small portion of the region outside of a radius of two miles from Woodville has been searched.

1. *Selenites concava* Say. Large form. Common, mostly on benches.
2. *Zonites fuliginosus* Griff. Frequent on benches.
3. *Z. lævigatus* Pfr. Common on benches.
4. *Z. ligerus* Say. Large form. Few very fine.
5. *Z. intertextus* Binn. Few on top.
6. *Z. arboreus* Say. Common on top. A peculiar form with strong striation above.
7. *Z. radiatulus* Gray. One example.
8. *Z. indentatus* Say. Few on benches.
9. *Z. wheatleyi* Bld. Few on benches.
10. *Z. milium* Morse. Few between rocks.
11. *Z. capsella* Gld. Three specimens.
12. *Z. Sterkii* Dall. Few between rocks.

13. *Z. fulvus* Drap. Very few on benches.
14. *Z. gularis* Say. Common on top.
15. *Z. internus* Say. Very common on top and benches.
16. *Z. sp.* (?) possibly a new species.
- 16a. *Zonites suppressus* Say.
17. *Patula alternata mordax* Shutt. Frequent on benches.
18. *P. Cumberlandiana* Lea. Very common on benches.
19. *P. perspectiva* Say. Common on benches among dead leaves.
20. *Helicodiscus lineata* Say. Very few on benches.
21. *Punctum pygmæum* Drap. Few.
22. *Helix clausa* Say. Few.
23. *H. thyroides* Say. Common in coves.
24. *H. albolabris major* Binn. Common on top.
25. *H. exoleta* Binn. Very common. Large with thick shell, (specimens from Chattanooga, Tenn. have very thin shell.)
26. *H. elevata* Say. One example. (Beautiful purple-banded var. taken at Chattanooga, Tenn.)
27. *H. hirsuta* Say. Common on top and benches.
28. *H. stenotrema* Fér. Common on benches.
29. *H. stenotrema* var. *globosa*, n. var. Very common between rocks.
30. *H. spinosa* Say. Few on benches.
31. *H. tridentata* Say. Frequent.
32. *H. fallax* Say. Frequent.
33. *H. inflecta* Say. Common on top.
34. *H. Rugeli* Shutt. Scarce on sides under rocks.
35. *H. appressa* Say. Very large and fine. Common on top and benches.
36. *H. Sargentiana* J. & P. (sp. nov.) common on rocks.
37. *H. obstricta* Say. Few on benches and in coves.
38. *H. pustuloides* Bld. Scarce, only six specimens taken.
39. *H. dorfeuilliana* Lea. Few in valley.
40. *Vallonia perspectiva* Sterki. Quite common.
41. *Strobila labyrinthica* Say. Common under bark.
42. *Pupa corticaria* Say. Very common.
43. *Pupa armifera* Say. Two examples in drift.
44. *Pupa contracta* Say. Common.
45. *Pupa curvidens* Gld. Common.
46. *Pupa curvidens* var. *gracilis* Sterki. Few.
47. *Succinea avara* (?) Say. Few young.

- 48. *Pomatiopsis lapidaria* Say. Common.
 - 49. *Carychium exiguum* Say var. *exile* Ad. Few.
 - 50. *Helicina orbiculata* Say. Common.
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ON A REVISION OF THE AMERICAN UNIONIDÆ.

CHAS. T. SIMPSON, WASHINGTON, D. C.

In looking over the September NAUTILUS I was greatly interested in the article on American Association of Conchologists, and heartily agree with the suggestion that the nomenclature of our American Unionidæ needs revising. But to do this properly will be an herculean labor, one that will require time, hard study, and infinite patience, as well as a love for the work.

In the first place most of the literature on the subject is out of print, and much of it, such as the New Harmony Disseminator, Nicholson's Encyclopedia and the like, is so rare as to be practically out of the reach of the average student. It is scattered in a very large number of publications and it will take a considerable amount of careful research to hunt up what has been written on the subject.

Much of this literature is in a terribly confused condition, and there are many disputed points which will require the nicest judgment to satisfactorily settle. Lea read the descriptions of most of his species before scientific societies, claiming that such reading was a bona fide publication, and dated them from that time; Conrad held that no species could be considered published until a description had been printed and circulated. There was a further dispute between them as to dates, Lea holding that of publication of the part or separata in which his descriptions were printed was valid, while Conrad claimed that the date should be given when the whole volume was issued. There are many disputed points between Say and Lea as to their species. Lamarek described his Unionidæ in Animaux sans Vertèbres, in Latin, giving each species from ten to fifteen words, without figures, and their identification largely rests on the fact that Dr. Lea afterwards examined the types.

Rafinesque, in his Monograph of the Bivalve Shells of the Ohio River, described and figured a large number of Unionidæ, but the descriptions are brief and unsatisfactory, and the figures are unrecognizable. Certain conchologists have considered his work valid, and

have attempted to identify his shells, others reckon him a quack and claim that he should not be recognized. So far as I know, few or none of his types are in existence, and those that have attempted to identify his species have not been able to agree among themselves. His work, like a tax-title deed, will always leave a cloud on what it was intended to cover.¹

The material itself forms an exceedingly difficult study, even if the literature was in a satisfactory shape. In North America alone there are in the neighborhood of 800 commonly recognized species of this family, very many of which are extremely close, and nearly all are quite variable. Only a small part of this territory has been at all carefully worked: even in New York, Mr. Wm. Marshall is making the most commendable efforts to record their distribution and find out what species belong to the State, a work which has never yet been done.

In the belt of country in the south known as the "Pine Region," extending from Virginia to beyond the Mississippi, and from the Atlantic and Gulf to the "Hill Country" specific lines among the Unionidae seem to be almost obliterated, owing largely, perhaps, to the sameness of configuration of the surface, and the uniformity of soil and climate. The British Possessions outside of Canada are for the most part a *terra incognita*, and of the eighty or more nominal species found in Mexico and Central America for the most part we know almost nothing.

We ought to have a knowledge of the anatomy of each species, but that is impossible at present, as few local collections are found over wide areas of our country, and of many forms only the type shell is known. It is enough to thrill the blood of a conchologist to read over the list of those earnest collectors who gathered in the treasures of our streams for Lea, and caught from him his grand enthusiasm; it reminds one of the roll call of some glorious company of soldiers who perished in battle. Anthony, Barrett, Boykin, Buckley, Budd, Clark, Downie, Edgar, Elliott, Emmons, Estabrook, Forshey, Hallenbeck, Jewett, Kirtland, Law, Leconte, Lewis, Lindsley, Lyon, Moores, Neisler, Pybas, Ravenel, Showalter, Spillman, Tait, Tuomey, Vanuxem, White and others of whom I believe not a soul remains living. There is no such corps of collectors of Unionidae to-day, and it will probably be a long time before there is again.

¹ Rafinesque's types are in the collection of the Academy of Natural Sciences of Philadelphia.—ED.

I think it is recognized by all who have at all carefully studied the family that Dr. Lea's arrangement, classifying by the presence or absence of a dorsal wing, by sculpture and form, is largely artificial and that some more natural system should be adopted. I believe that the subgenera of Rafinesque, Swainson, Agassiz and others are of little value; it seems to me that an arrangement into groups around certain characteristic and fairly typical species is the most natural that can be made. But while there are large numbers of species among which the strongest relationship is at once apparent there are many others which seem to stand on the border land, and which may as well be placed in one section as another; others, by the characters of certain specimens, appear to have an affinity in one direction and by those of others to belong elsewhere, while there are some nondescripts that do not fit anywhere.

It is my intention to publish some time in the future a Geographic and Systematic Catalogue of the Unionidæ of North America, but it will require years of patient study to prepare it. I also hope at some time to be able to monograph our species.

So far as the South American forms are concerned our material and knowledge are so limited it seems to me it would be almost unwise to attempt at present to do anything with them. Dr. von Ihering is doing excellent work with the Unionidæ of this region and probably has a better understanding of the subject than any man living.

ON THE REVISION OF THE UNIONIDÆ.

BY S. HART WRIGHT AND BERLIN H. WRIGHT, PENN YAN, N. Y.

EDITOR NAUTILUS:—In the September number of THE NAUTILUS, the specialists in Unionidæ are asked to reply to a suggestion that a Committee be appointed to classify and revise the nomenclature of the American Unionidæ.

It is well known that the history of this branch of Conchology is somewhat tainted with personal bitterness and rivalry. The nomenclature is in consequence slightly chaotic: and the synonymy though not more extensive than in the Helices, or in Botany or Ornithology and many other sciences, still needs sifting out. A classification too, still better than Lea's if possible, should be brought for-

ward. The determination of priority of names is a delicate matter in many of our Unionidæ, and it should be settled *officially* by a Committee on lines of equity, rather than by an individual. The same is true also, in discarding a so-called species, and in elevating a synonym to take the first rank.

We have so many species of Unionidæ in North America, that *extremists*, both at home and abroad, look upon the list as one that is over-loaded. A revision by Committee should command general acquiescence. It is not true that *our* nomenclature is burdened like that of Europe.

NOTES AND NEWS.

THE address of Mr. John Ford will be in future *Holmes Station, B. & O. R. R., Delaware Co., Pa.*

DR. W. S. STRODE has removed from Bernadotte to Lewistown, Ill., where he will hereafter be permanently located.

EXTRACTS from a letter to the Editor from DR. WM. H. RUSH, dated *U. S. S. Yantic, Montevideo, Uruguay, March 11, 1892.*—"Since being here I have been able to do very little and have not seen a native land shell. One trip out to the suburbs of Montevideo only yielded some *Helix lactea*. At Buenos Ayres I found the British Cemetery overloaded with *Helix pomatia*. In the swamps around Buenos Ayres I found an *Ampullaria* very common, which is, I think, *australis*, and while up at Palermo Park I found another which I took to be *canaliculata*. Further collecting around the swamps led me to believe that they are the same species. The coloration of the animal varies from a very dark brown to a light mahogany brown; the coloring of the animal also leads to corresponding variation in the color of the shell. Both forms are banded. I saw many in the act of copulation, a light with a dark individual, etc. I tried to preserve a lot of their eggs, but so far I have not met with any success. *Planorbis perigrinus* is also very common; also a species of *Puludestrina*. While walking down the Boca one Sunday afternoon I observed quite a crowd collected around a man standing on the curbstone. Upon approaching I saw that he was opening a bivalve which was being eaten by the people,

just as we eat oysters at home, excepting that he had scalded them first. Before I left I had secured fifty nice specimens, and learned the locality, which is Mar del Plata, a summer resort on the coast of Argentina. I can find no figure of it in d'Orbigny, and from Tryon's Structural and Systematic Conchology I judge it to be a *Lutraria*.

"*Helix lactea* is extremely common in the markets at Buenos Ayres, and I suppose it can be accounted for by the numerous Italians there.

"I want to mention that while coming down here we were boarded when three hundred miles off the coast of Brazil (lat. $30^{\circ} 09' 07''$ S., long. $45^{\circ} 36' 39''$ W.) by a swarm of decapods, they flying from the water and landing on our deck and in the chains. Our deck is at least twelve feet above the water, and to get upon it they had to go over the hammock nettings. I secured fifteen specimens of various sizes. There were hundreds more but they were injured so much by their fall as to be of no value. I enclose a hasty tracing from a water-color sketch I made from the largest one."

THE UNIONIDÆ of Spoon River, Fulton Co., Ill., are enumerated and intelligently discussed by Dr. W. S. Strode in the *American Naturalist* for June.

THE RECORDS of progress in American zoology which the *American Naturalist* publishes from time to time are a total failure as far as mollusks are concerned. The most prominent feature of the record is the omission of important papers. Our contemporary should not judge American malacology by the handful of papers that chance to fall upon his desk.

AT THE MONTHLY meeting of the Linnean Society of New South Wales, Australia, June 30, 1892, a paper was read entitled "On the Genus *Perrieria*," by C. Hedley, F. L. S. This paper deals with the rectification of nomenclature; it points out (1) that the type of *Coeliaxis* is and must remain, not *exigua* Ad. & Ang., as misquoted by Fischer and Tryon, but *layardi* Ad. & Ang., as instituted by the founders; (2) that *exigua* was based in error upon specimens of *australis*; (3) that *australis* and *layardi* are generically incompatible; and (4) that *australis* (= *exigua*) is rightfully comprehended under the genus *Perrieria* Tapparone-Canefri.

An apropos addition to this "clearing up" may be made here. Ancey, in the *Conchologist's Exchange*, September 1887, p. 39,

proposed the name *Bathyaixis* for *Coeliaxis layardi* Ad. & Ang., which is, as Mr. Hedley has stated, the type of the genus *Coeliaxis*!

SPECIES IDENTIFIED. From L'Abbé P. A. Bégin, Sherbrooke, Prov. Quebec, Canada. 1, *Goniobasis livescens* Mke, var. 2, *Physa ancillaria* Say. 3, *Limnæa catascopium* Say. 4, *Sphærium striatinum* Lam. 5, *Aplexa hypnorum* Linn. 6, *Planorbis bicarinatus* Say. 7, *Campeloma integra* Say, young specimens. 8, *Physa heterostropha* Say. 9, *Ferussacia subcylindrica* Linn. 10, *Helix albolabris* Say.—H. A. P.

CONCHOLOGISTS who do not already possess a copy of Tryon's "STRUCTURAL AND SYSTEMATIC CONCHOLOGY" should procure it now. This work is indispensable to the collector who wishes to gain an intelligent idea of the affinities or structure of shells, or to classify a collection. The plates illustrate thousands of species representing all of the genera and subgenera, and the text contains interesting chapters on geographical and geological distribution, structure, classification, etc. It is the most complete text book on the subject in the English language.

NOTE ON LYOGYRUS. In our article upon this genus in the October NAUTILUS, we *intended* to mention all of the described species. Mr. Ford has called our attention to the fact that *Lyogyrus Brownii* Carpenter was omitted,—an oversight naturally very annoying to the author, and of course purely unintentional. This form was described some years ago by Mr. H. F. Carpenter, the well-known writer upon New England and especially Rhode Island shells. It is allied to *L. pupoides* Gld., differing from that species in having the body-whorl *not* free from the preceding, or only slightly so, whilst in the typical *pupoides* it is decidedly separated. The two should be carefully compared with a large mass of material, in order to ascertain whether they intergrade. In both, the spire is very much higher and more conical than in the *L. Dallii*.—H. A. P.

INSTRUCTIONS FOR COLLECTING MOLLUSKS AND OTHER USEFUL HINTS FOR THE CONCHOLOGIST, is the title of a pamphlet of fifty-six pages, issued by the U. S. National Museum, and which can be obtained by application to the Director of that Institution. The author, Dr. Wm. H. Dall, has embodied in it a large amount of most useful information on methods of collecting mollusks of all sorts, land, fresh-water and marine, the chapter on dredging and the con-

struction of dredges and other apparatus being especially full and timely. More space should have been given to the methods of preservation of the soft parts and naked mollusks, those in vogue among collectors being very crude and by no means up to the times. Altogether the brochure will be found very useful to active collectors.

GOULD'S 'NORTH PACIFIC EXPLORING EXPEDITION' TYPES.—“Apropos of Mr. Marshall's note in the August NAUTILUS it may be as well to state that practically all Gould's type specimens of the “Wilkes” and “Ringgold and Rodgers” exploring expeditions are to be found in the National collection. They were of course Government property, but Dr. Gould who described them, for the most part gratuitously, was permitted to retain as remuneration, duplicate specimens for his own collection now at Albany. So of those species of which there were duplicates there may be said to be two sets of types. The uniques are in the National Museum. How Mr. Tryon came to confuse these specimens with those illustrating the mollusk-fauna of the eastern coast of the United States, which, with sundry alcoholic specimens, were destroyed while loaned to Dr. Stimpson at Chicago, I do not know; but that they did not go to Chicago and are at present in my official custody is indubitable.—*Dr. Wm. H. Dall, Curator Dept. Moll., U. S. Nat. Museum, in letter to Ed.*”

EXCHANGES.

WANTED. Fine specimens of Lobsters, Crabs, Fiddler crabs, Prawns, Shrimps, Marine, Land and Fresh-water shells. Offered specimens of Marine, Land and Fresh-water shells. Please send list and I will do the same in return.—*Thomas Morgan, P. O. Box 164, Somerville, N. J.*

OFFERED. Land and Fresh-water shell from East Indies and Ceylon, in exchange for Land and Fresh-water shells, from West Indies, California, and Central America.—*Miss Linter, Arragon Close, Twickenham, Middlesex, Eng.*

WANTED, Land Shells. Offer, twenty species of Kansas Fresh-water Shells, including the rare *Unio Aberti* and *Physa solida* Lea, and Land Shells and Cretaceous fossils.—*Frank J. Ford, 314 Wabash Ave., Wichita, Kansas.*

THE NAUTILUS.

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DECEMBER, 1892.

No. 8

PRELIMINARY DESCRIPTIONS OF NEW MOLLUSCAN FORMS FROM WEST AMERICAN REGIONS, ETC.

BY ROBERT E. C. STEARNS, U. S. NATIONAL MUSEUM.

Uvanilla regina Stearns.

Shell conical, imperforate, black or purplish-black ; whorls six to seven, concave, longitudinally somewhat obliquely plicated, the plicæ more or less projecting at the suture, and on the edge of the basal whorl, producing an undulating or crenulated effect. Otherwise sculptured by incremental striæ which traverse the surface and cross the plicæ at right angles. Base concave, radiately, closely and prominently striated, more conspicuous, flattened, coalescing, and sinuously curving at the edge. Commencing at the point where the outer lip joins the body whorl, a shallow groove follows parallel to the periphery and extends toward the aperture, without interrupting the basal sculpture. Aperture obliquely subangulate, black-rimmed and crenulated on the thin edge of the outer lip ; nacreous, silvery white toward the edge, bright lustrous golden yellow within and around the umbilical region which latter though deeply pitted is not open. Columella white, calloused, arcuated with a moderately developed rib bounding the umbilical depression, and terminating in a single tubercle. This rib is paralleled by a shallow furrow terminating in a notch just below the tubercle, and by an exterior or outer ridge, part of the way double, of a brilliant orange color ; this orange-colored rib is also exteriorly bounded by a shallow

furrow which becomes obsolete toward the aperture. The base of the shell otherwise exhibits faint revolving sculpture.

Dimensions: Altitude, 36 mm., diameter maximum, 34 mm.

The above combines the sculptural features of the Japanese *Chlorostomas* and West Mexican *Uvanillas*, more particularly *U. olivacea*. It is a much handsomer shell than the latter and the most northerly form of the group yet detected on the West Coast.

Chlorostoma gallina Forbes var. *multiflora* Stearns.

Shell imperforate, large, solid, turbinate globosely conical, elevated; whorls five-and-a-half to six-and-a-half, rounded; suture simple not channeled; apex obtusely pointed, eroded and yellowish; color nearly black; sculpture consisting of numerous spiral or revolving closely set narrow rounded ridges or costae, alternating with fine incised whitish lines or grooves. Aperture rounded oblique, interior pearly, outer edge rimmed with black and finely crenulated by the projecting ends of the modified whitish grooving. Columella arcuated with two blunt tubercles near the base and a shallow umbilical pit above; base convex.

Dimensions: Altitude, 36 mm., diameter maximum, 34 mm.

The above differs from the typical *gallina* in the absence throughout of any longitudinal markings or sculpture and from Hemphill's var. *tincta* by the lack of the "streak of yellow on the base just below the columellar teeth," also by the conspicuous ribbing and grooving of the entire surface, while in *tincta* as described, "the spiral grooves" are "generally scarcely visible above."

While strongly characterized, the example before me can hardly be assigned to a higher than varietal rank.

The two forms above described were collected by Captain George D. Porter at Guadaloupe Island off the coast of Lower California.

Bulimulus (*Pleuropyrus*) *Habeli* Stearns.

Shell slender, elongated, thin, smooth and shiny, slightly umbilicated, with thirteen to fourteen gradually increasing whorls; whorls slightly convex and longitudinally obtusely plicated; suture distinct; aperture ovate and slightly reflected at the base of the columella. Color ashen white, slightly rufous, with hints of a narrow reddish band beneath the surface glaze.

Dimensions (of largest example): Long, 17.5 mm., diameter, 3.5 mm.

This form is much more slender than *P. chemnitzoides* Fbs., which is well represented by the figures 6a, 6b, plate IX, Proc. Zool. Soc. London, 1850. Aside from the differences in color and sculpture, the surface of Forbes's species is dull in fresh, unrubbed, perfect specimens; the ribs in the latter species are comparatively sharp, thread-like, regular, and somewhat distant, the interspaces being perceptibly wider than the ribs are thick.

Two perfect examples, U. S. Steamer Albatross. The U. S. National Museum also contains specimen collected by Dr. S. Habel several years ago, as well as examples of Forbes' species.

Chatham Island, April 4th, 1888.

A brief description of the foregoing was included in Mr. Dall's paper, "On some types new to the fauna of the Galapagos Islands" in THE NAUTILUS, January, 1892, which also contained descriptions of *Helicina* (*Idesa*) *nesiotica*, *Leptinaria Chathamensis*, *Zonites* (*Hyalinia*) *Baueri*. Reibisch¹ who has recently published a paper on the Fauna of the Galapagos Islands, was probably not aware of Dall's article, as he has apparently redescribed the same forms.

Orchidium Lesliei Stearns.

Form rounded ovate, nearly as broad as long. Dorsum coriaceous, nearly black, shiny, closely irregularly reticulated, with finely incised lineation, and otherwise characterized by somewhat distant flatly rounded papillæ. Underside, dingy yellowish white; margin of mantle wide, nearly smooth; edge of same simple. Anal opening posterior, near edge of mantle and somewhat produced. Respiratory orifice smaller, in median line with and in front of anus. Sexual orifice anterior on the right side, under the edge of the large oval hood or collar. Labial palpi thin, largely expanded.

Charles Island, April 8th, one example; Albemarle Island, April 10th, 1888, two specimens between tide-marks. United States Steamer Albatross.

Littorina (*Tectarius*) **Galapagensis** Stearns.

Shell small, rather solid, ovate-conic, angulated in outline; five to six and a half whorls. Whorls covered with obtusely rounded rather coarse nodules; of these the peripheral series is the strongest, the next preceding less prominent, while the other girdles of nodes are less conspicuous. The peripheral is closely followed by a

¹ Die Concholiologische Fauna der Galapagos-Inseln, von Paul Reibisch, Ges Isis in Dresden, 1892, Abh. 3, 20, pp. 2 plates.

parallel series just below, and the basis is marked by succeeding rows of less prominence. Aperture rounded, ovate, and of a dark chocolate color; columella broad, excavated and produced below. Exterior dull chocolate, brown above, paler below, with still paler nodules.

Dimensions: Altitude, 7.50 mm.; latitude, 5 mm.

While in its general faciēs it much resembles both Antillean and Indo-Pacific forms hitherto described, a comparison with such as most nearly approach it, indicate its non-identity.

James Island, one example, Albatross collection.

Nitidella incerta Stearns.

Shell small, rather solid, acutely ovate, spire elevated, pointed; whorls six to seven, moderately convex, with inconspicuous revolving grooves; upper whorls delicately sculptured with close set rounded longitudinal ribs. Apex obtuse. Aperture nearly half the length of the shell. Outer lip somewhat thickened with five to seven denticles on the inner side. Columella with a single rather prominent plait or tubercle just below the middle. Surface colored by five to six brownish-red bands, alternating with as many white ones on the body whorl.

Dimensions: Length, 6.02; length of aperture, 3; breadth, 2.75 mm.

The above is based on a single perfect example collected by Dr. Habel. It is nearer to Carpenter's *millepunctata* than to any other west coast form, but exhibits color and other differences when placed side by side with that species for comparison.

Galapagos Islands (special island not stated). Dr. Simeon Habel.

Littorina (Tectarius) atyphus Stearns.

Shell small, ovate subturritid, with five whorls; the basal traversed spirally by five principal obtuse keels or ribs, broken into nodules; of these the peripheral are the strongest. Between these and below the lower of the stronger keels, fainter keels are perceptible; the penultimate whorl shows three rows of nodules; of these the two upper are the more prominent, and the lower one is sutural and inconspicuous. Color dull ashen chocolate above, lighter below the periphery of the basal whorl, and mottled below the lowest keel. Aperture rounded ovate, dark colored; columella somewhat excavated and of a pale chocolate tint. Near the base of the columella

the hint of a lightish band may be seen from the edge of the outer lip, inward.

Dimensions: Altitude, 6.25 mm.; latitude, 4 mm.

Manta, Ecuador; collected by Dr. W. H. Jones, United States Navy. This is the first example of the genus detected on the west coast of the American Continent. Published by name only in my list as below.²

NOTE ON *ACMÆA SACCHARINA* (LINNE.)

BY REV. GEO. W. TAYLOR.

I have lately had an opportunity of examining several hundred specimens of *Acmæa saccharina* (Linne) and have come to the conclusion that it is a species that varies comparatively little, and that Mr. Pilsbry is wrong in supposing (see Manual of Conchology, vol. XIII, p. 50) that *A. stellaria* Rve. or *A. octoradiata* Hutton or his own *A. perplexa* are forms of it.

A. saccharina is nearly always distinctly seven rayed. It is common on the Chinese and Japanese coasts but has not been noticed by me in collections from the South Pacific Islands.

A. stellaria Rve. is an eight rayed species. It was described I think from New Holland; my own specimens are from Raratonga and I suppose it to be a species of the South Pacific fauna. Reeve's figures are very good and are copied by Pilsbry, pl. 36. The shell figured by the same author on pl. 61, fig. 65 is also of this species as Mr. Pilsbry surmised (Manual of Conchology, XIII, 99).

Acmæa perplexa Pilsbry seems to me to be abundantly distinct from either of the above named species. It is described as with seven rays but figured with eight which is the correct number.³ It is a well marked species quite unlike any other *Acmæa* known to me. My specimens were collected in New South Wales from which locality, by the way, I have shells which I refer to *Acmæa marmorata* T-Woods, which much more nearly resembles *saccharina* than does any specimen of *perplexa* I have seen.

² Vide Proc. U. S. Natural Museum, Vol. XIV., p. 326. "List of shells collected on the west coast of South America, principally between latitudes 7° 30' S., and 8° 49' N," etc., 1891.

³ Mr. Taylor is correct in stating that *A. perplexa* is always 8-rayed. The statement that it had but seven was an error.—ED.

If my views are correct the synonymy of the above mentioned species will stand thus:

Acmaea saccharina (Linne). Habitat. China and Japan.

= *lanx* Rve.

= *stellaris* Q. & G. (non Rve.)

= *stella* Lesson.

Acmaea stellaris Rve. (non Q. & G.). Habitat. South Pacific Islands.

= ? *octoradiata* Hutton.

Acmaea perplexa Pilsbry. Habitat. Australia.

A NEW LAND SHELL FROM SUMATRA.¹

BY T. H. ALDRICH.

Nanina (*Ariophanta*) *Dohertyi* n. sp. Pl. I, fig. 1, 2.

Shell thin, waxy pellucid, light green, corneous, subimperforate, whorls six, suture slightly margined, impressed, bordered below with a narrow white line, body whorl acutely carinated and ridged, produced at aperture into a flattened spade-like terminal; spire high. Aperture subtriangular, lip reflected strongly, almost completely covering the umbilicus.

Locality, Marang, on Southwest coast of Sumatra.

NOTE. This shell is doubtfully placed in *Ariophanta*. It resembles *Nanina nasuta* Metcalfe described from Borneo but is much higher, lacks the band of that species, and is differently produced. Received from Wm. Doherty, Esq. who states that when alive it is green with a singularly delicate epidermis, and is arboreal in its habit. Its color makes it almost invisible. Six specimens received.

MESODON ANDREWSI IN MISSOURI.

BY F. A. SAMPSON, SEDALIA, MO.

I send for inspection a shell found by me in St. Francois County in southeast Missouri. While arranging my "Missouri collection"

¹The illustrations of this species will appear in our next number.

I was struck with the very evident differences between it and the *albolubris* among which I had placed it. The latter all have but little over five whorls, with aperture somewhat contracted by being flattened toward the plane of the base. This shell has the globose form, the rounded aperture, the swollen last whorl, elevated spire, nearly six whorls and all the characteristics of *Mesodon Andrews*.

I have before me a specimen received from Mr. Binney with his label showing that it was one of the original lot from which *Andrews* was named. The Missouri shell does not materially differ from it in any respect. It is very slightly larger than the North Carolina shell, but not so large or solid as *Andrews* from Talula Falls, Georgia, also received from Mr. Binney.

H. Andrews is a species of the Cumberland subregion, but other species of that region extend to Missouri, as for instance *Stenotrema labrosum* Bld., and I have no doubt of the correctness of my identification, though it makes an unexpected extension of the habitat of this species.

A VISIT TO WARD'S.

One stormy night in November the Editors and Manager of THE NAUTILUS, and their friend the Vice-President of the American Association of Conchologists, found themselves *en route* for Rochester, N. Y., via the famous Lehigh Valley route. The object of their pilgrimage was to see the largest Natural History Establishment of its kind in America,—PROF. WARD'S. Dawn of the next day found us still far from our journey's end, near Ithaca, and in sight of the classic walls of Cornell College, where NEWCOMB labored so many years. From here, we rode for miles along the beautiful shores of Cayuga Lake, lying like some shining serpent between its dark Devonian and Silurian cliffs. Then breakfast at Seneca; and finally Rochester was reached where we were hospitably received by Prof. Ward, and by his able assistants Messrs. Crump, DeLaney, Baker and Walton. After the usual amount of talk incident upon the meeting of a half-dozen lovers of shells, we started on a tour of inspection, an account of which I will give in the words of one of our number.

"Here is a grand treat, not only for the lover of nature but also of art, for the preparation of objects of natural history (where accuracy

is of the first importance) is indeed a most difficult art, requiring not only a skillful artisan but a scientist as well. If a museum is a collection of prepared specimens, here is a collection of museums in course of preparation. This work is carried on by a force of from forty to fifty in a group of twelve or fourteen large buildings, each devoted to a special department. Our time being limited we could only take a glance at most of the departments. The nearest building to Prof. Ward's residence contains the minerals. A rich collection of meteorites many of them cut in sections. A splendid series, of the many varieties of Quartz. Many interesting forms of the calcite group, including long stalactites, etc., also beautiful specimens of apatite, garnet, malachite, stibnite, etc. In the next building is the geological department; and here we see a specimen which is a treat to both the paleontologist and conchologist: this is the *Cerithium giganteum* from the Paris Basin (eocene) with a perfect aperture. The entire shell is about a foot long, the aperture being expanded like that of a Stromb. A great series of beautiful Ammonites many of them cut and polished, makes the collector of recent shells envy the paleontologist and wish that even one species had survived with its near kinsman the Nautilus. Here, too, are polished slabs showing sun-cracks, the cracks filled with calcite, great slabs four to eight feet in length covered with ripple-marks, while near at hand is the modelling room, where casts and restorations of rare and unique fossils are prepared. A cast of a great *Glyptodon* is in course of construction. In an adjoining room an Irish elk is almost ready for the museum, also a beautiful piece of work for an archæological museum, a model of the 'Serpent Mound' of Ohio.

"The relief-maps represent a great deal of careful and accurate work. This is the class of maps that should be in every museum, college, and school. Prof. Ward is now at work on a large relief-map of New York State for the State exhibit at Chicago. The department of human anatomy contains many examples of exquisite workmanship. Hastily going through the department of taxidermy we note the large mounted elephant with its young, arranged in a very natural and attractive manner; the Indian and American buffalo, side by side; the many species of *Cervide*; the large groups of monkeys; superb specimens of the Bengal tiger, male and female. 'The skunk family' in and around their burrow, as natural as life, is both instructive and amusing; and the hundreds of other spec-

imens all show the highest art in taxidermy. Above the mammals are the birds, which our limited time did not permit us to examine. The adjoining room is the osteological department. Specimens from the elephant and hippopotamus to the small rodents and birds show as near perfection as it is possible to obtain in this difficult branch. In the room above this is a large collection of mammalia skulls."

The invertebrates have long claimed a large part of Prof. Ward's attention; and the magnificent series of corals, sponges, echinoderms and crustaceans, attest alike to the fruitfulness of his journeys abroad and to the skill of his workmen at home.

In spite of the attractions of other departments, our time was mainly spent in the "Shell House." The upper story of this building is occupied with a suite of rooms containing Prof. Ward's special collection of invertebrates, the mollusks being arranged in table-cases along the sides and down the middle of two large rooms. The plan of this collection is to have *every genus* represented by characteristic species, and to have the very best specimens of each species that can be obtained. The result is a strikingly beautiful as well as an uncommonly instructive collection. For the past decade or more, Prof. Ward has been giving special attention to the mollusks; and the results of many a journey half round the globe are here shown. Abalones and limpets from California and the northwest coast; Cypræas, Murices, Olivas, Pleurotomas from Panama; Chitons, black Trochi, Cancellarias, etc., from Peru, and limpets of the *Nacella* type from Magellan and Chili, secured during a trip around South America, represent part of the conchological plunder, while bones of the great fossil edentates, and magnificent minerals galore also were secured. The fruits of other journeys are seen in the splendid suites of *Magilus* and *Leptoconchus*, from Mauritius; Strombus, Cones, Cassis, Cypræas, Tridacna, Malleus, Aspergillum and many others from the Indian Ocean; and besides these, desirable species have been selected from the dealers of London, Paris and Berlin. Not the least part of the pleasure in looking over this collection is the fund of anecdote and adventure connected with many specimens secured by Prof. Ward in unfrequented corners of the world.

The work of classifying this great collection has been well performed by Messrs. Crump, DeLaney, Baker and Walton; the last named gentleman having supplied exquisite colored drawings of Nudibranchs and other naked mollusks.

The lower floor of the same building is Prof. Ward's stock of mollusks and invertebrates, one of the largest stocks of shells in the world, classified in labelled drawers, for the convenience of purchasers.

Again we are homeward bound, and are passing the time in showing, by turns, the specimens secured, and praising or criticising one-another's acquisitions; but in one thing we all agree—that the instruction and pleasure of seeing Prof. Ward's shells, and the enjoyment of a day spent in the company of the Professor and his able lieutenants, is well worth a visit to Rochester.

NOTES AND NEWS.

NOTES ON *UNIO LUTEOLUS* Lam. In THE NAUTILUS for November last Mr. Geo. W. Dean in distinguishing this species from *U. radiatus* adduces the uniform color of the nacre of the luteolus. This is as a rule quite true. But specimens from the northern part of this State occasionally have the posterior part of the interior tinged with a very delicate pink. In a quite peculiar local form of small size found by Dr. M. L. Leach in Crystal Lake, Benzie County, the tendency is quite marked and nearly every specimen has the rosy tinge to the nacre. I have never, however, seen a specimen in which the whole of the nacre is thus colored, as occurs in *U. radiatus*.—*Bryant Walker*.

STROBILA LABYRINTHICA VAR. *VIRGO*. We have received from Rev. H. W. Winkley of Saco, Me., specimens of a *Strobila* differing from *labyrinthica* in being somewhat larger and more depressed, and translucent-white in color, the lip and lamelle opaque-white. This variety was found by Mr. Winkley near Sebec Lake, Piscataquis Co., Maine.—*Pilsbry*.

A NEW COLOR-VARIETY OF *HELIX ALAUDA* Fér. Mr. Franciscos E. Blanes has lately found, at Maisi, Cuba, a variety of the above species which he proposes to name var. *Weeksiana*, in honor of Mr. W. H. Weeks, Jr., of Brooklyn, N. Y. The variety has the following characters:

H. ALAUDA color-var. *WEEKSIANA* Blanes. Form globose-trochoid with the whorl very strongly deflexed at the mouth. Color pure white with faint oblique pink streaks. Lip bright pink; aperture yellow inside.

Mr. C. A. WHITTEMORE has been elected curator of the museum of the Kent Scientific Institute, one of the oldest scientific societies of Michigan.

GOULD'S TYPES AND MS. That which was burnt at Chicago at the big fire was not Gould's *types* of North Pacific Exploring Expedition but his *complete MS.* and notes, absolutely ready for publication. As conchological executor of Dr. Gould, his family gave me his MS. I kept this of North Pacific Expedition in my fireproof till Stimpson begged me to send it to him at Chicago, where it was burnt.—*W. G. Binney.*

EDS. NAUTILUS: I notice in Mr. Simpson's article on the revision of the American Unionidæ that he believes that not a soul of those of whom he gives a list as collectors in Lea's time remains living. I can say for one that Moores is still living and has been for the past eighty years and five months.—*H. Moores, Columbus, Ohio.*

A NEW SPECIES OF ENNEA has been dedicated to Rev. A. B. Kendig, of Brooklyn, N. Y.—*E. Kendigiana* Rolle, described in the last number of the German Malacozoological Society's *Nachrichtsblatt*. It is from Senegambia.

A REPRINT OF THE "CONCHOLOGISTS EXCHANGE." Many subscribers to THE NAUTILUS desire to obtain the '*Conchologists Exchange*,' but are unable to do so because it is out of print. The proprietors of THE NAUTILUS have been requested to reprint the *Exchange*; and if a sufficient number of orders for the reprint can be obtained to pay the cost of it, they purpose to issue it in the same form as the present journal, indicating the original pagination. The cost of the reprint will be 75 cents for the two volumes. Those who wish to secure them should address the manager of THE NAUTILUS.

Mr. Hedley wishes it to be noted that he now regards the shell, jointly figured and described (P.L.S.N.S.W. (2), vi, p. 558) by Mr. Musson and himself under the name of *Pupa anodonta*, as a second species of the genus *Heterocyclus*, instituted by Crosse (Journ. de Conch., Vol. xx, 1872, p. 156) for the reception of *H. perroquini* Crosse, from New Caledonia. This genus is considered by Fischer (Manual de Conchyliologie, p. 735) equivalent to *Lyogyrus*, a member of the *Valvatidæ*.

Part 1, of Vol. xv, of the Trans. Royal Soc. of South Australia, lately issued, contains nine plates illustrating Australian Tertiary mollusks described by Prof. R. Tate. There are several very large

and peculiar *Cypræas* and *Comus* among the number. *Trichotropis* and *Scalaria* are also well represented.

NEW MOLLUSKS OF ST. HELENA. Mr. E. A. Smith of the British Museum has lately described the land shells of the island St. Helena¹, enumerating 27 species, of which 11 are new, and illustrating them with excellent figures. The prominent characters of the fauna are a group of thin *Bulimuli*, the very variable and curious *B. aurisvulpina*, which has been known for over a century, and a group of *Patula*-like shells very similar to the Pacific group *Endodonta*. Besides these, a novel form is described under the name *Tomigerus* (?) *perevilis*. We can scarcely believe that this belongs to the South American section *Tomigerus*. It seems to be a distinct genus of *Pupidae* comparable to *Boysidia* and *Hypselostoma*, but distinct from either; and deserving of a separate generic name. We therefore propose to call it *CAMPOLÆMUS*. The following characters may be assigned to the group: T. dextrorsa vel sinistrorsa, parva, anfr. ult. valde ascendens, pone labrum constrictus et serobiculatus; apertura ovata, superne sinu circulari instructa.

EXCHANGES.

WANTED. Works on Land Shells, and rare North American and Foreign Helices. OFFERED, *Mesodon dentiferus*, *Sayii*, *Acanthinula harpa*, etc.—A. W. Hanham, Bank of British North America, Quebec, Canada.

WANTED, by purchase or exchange,—good specimens of *Anodonta ferussaciana* Lea, size immaterial provided beaks are perfect.—Bryant Walker, 18 Moffat Bld, Detroit, Mich.

TO EXCHANGE in large or small quantities. *Anodonta suborbiculata* Say and *Anodonta corpulenta* Cooper, also about 40 species of the fine Spoon river *Uniones* and univalves.—Dr. W. S. Strobe, Lewistown, Ill.

EXCHANGE. *Unios heterodon* Lea, *lanceolatus* Lea, *Tappanianus* Lea, *Anodonta Williamsii* Lea and *Marg. undulata* Say (pink var.) for other *Unios* not in collection.—W. T. Farrer, Orange, Va.

¹ P. Z. S. Lond. 1892, p. 258.

THE NAUTILUS.

VOL. VI.

JANUARY, 1893.

No. 9

CATALOGUE OF THE GENUS *PARTULA*.

BY W. D. HARTMAN, M. D.

(Concluded from November number.)

The genus *Partula* proposed by Baron Férussac in 1819, is restricted to certain small land shells inhabiting the Pacific Islands. The species are found throughout all the groups of these islands, and as far west as New Guinea, which seems their limit. North of the equator they are found at the Caroline, Pelew and Ladrone Islands, and recently the Solomon and New Hebrides Islands have afforded several new species. They have not been found at the Sandwich Islands, New Zealand or Australia. In the Viti group, Mr. Andrew Garrett has discovered that some species are restricted to a single valley, each of which has its specific center, and the range of many species is quite circumscribed. In the Marquesas group some species are found on top of the highest mountains, like many other land shells. The species are either arboreal or terrestrial; hybrids are often found, and they occur between arboreal and terrestrial species. Some hybrids appear to possess a certain degree of fertility, and Mr. Garrett informs us that ten species in the Viti group have produced local varieties. The shells of some species are stout and solid, while others are thin and attenuate. Many species have a tooth-like projection from the inner margin of the peristome giving the aperture an auricular appearance; nearly one half of the species possess this button-like tooth on the parietal wall. Individuals of some species are entirely sinistral while others are

13. Macgillivrayi Group.

<i>P. macgillivrayi</i> Pfr.	<i>P. turricula</i> Pse.
<i>P. caledonica</i> Pfr.	<i>P. radiolata</i> Pfr.
<i>P. carnicola</i> Hartm.	<i>P. eburnea</i> Hartm.
<i>P. paterna</i> Hartm.	<i>P. proxima</i> Hartm.
<i>P. eximia</i> Hartm.	<i>P. pyramis</i> Hartm.
<i>P. albescens</i> Hartm.	<i>P. auraniana</i> Hartm.
<i>P. alabastrina</i> Pfr.	<i>P. compressa</i> Pfr.

Subgenus *Diplomorpha* Ancey.

The jaw, lingual dentition and genitalia are like *Partula*. The shell does not possess spiral striæ.

<i>D. layardi</i> Braz.	<i>D. delatouri</i> Hartm.
<i>D. coxi</i> Hartm.	<i>D. peasei</i> Cox.

BIFIDARIA: A NEW SUBGENUS OF PUPA.

BY DR. V. STERKI, NEW PHILADELPHIA, OHIO.

In the "Preliminary List of North American Pupidæ"¹ the name of this subgenus has been published, but without further note except that it was in my mss. for a few years. Since then I have obtained other species belonging to it, and became more and more convinced that it is really a natural group, and one of the richest in species.

The forms ranging under it are small, few exceeding 3 mm. of altitude (*P. armifera* Say, *hunanana* Grdl.). In shape they are rather various; cylindric, turriculate, conic, ovoid. The color is a lighter or deeper horn, to chestnut on one, to colorless, i. e. whitish or glossy-albino on the other side; in some the coloration is rather constant while others show all these variations, e. g., *P. hordeacea* Gabb. The surface is smooth, polished, or finely striate or, though rarely, with fine ribs; heavily ribbed forms have not come to my notice. A prominent feature lies in the formation of the apertural lamellæ, or plicæ, especially in the one on the parietal wall; it is (with few exceptions) large and more or less distinctly complex, designated in the descriptions as "complex, twisted, bicuspid, bifurcate, emarginate,

¹ The Nautilus, VI, p. 4 and 7.

medio excavata, bifida," etc., and from this character the name of the group has been derived. A close examination of the different forms as well as of immature examples leaves no doubt that it is in fact composed of two different lamellæ, the parietalis (inner, deeper) and supraparietalis (outer, or "angular"), almost separate, side by side in some species (*recondita* Tapp.-Can.), united to almost a simple one in others (most of *P. rupicola* Say), comparatively small in *P. curvidens* Gld. and *pentodon* Say, as here the supraparietal is very small or almost obsolete.

The columellar, equally constant, is generally also somewhat complex. The typical inferior and superior palatal plicæ are always present, though sometimes quite small, and are, as a rule deep seated, never reaching the margin; in some species one or the other of them is in a peculiar oblique position (*P. contracta* Say, *P. recondita*). Generally there is a "tooth" or short fold at the base, in some species present or absent. Additional dentiform or lamelliform plicæ, sometimes very small, but characteristic, are found in many species; one on the parietal wall, between the "parietal" and the columella, constant (*P. armigerella* Reinh.) or inconstant (*P. curvidens* Gld.), one above the upper palatal (*P. armifera* Say) one between the two palatals, inconstant (*P. pentodon* Say, *curvidens* Gld.)

As there is no rule without exceptions—and in natural science these "exceptions" are always highly interesting!—some, or even all, of the typical folds may be absent in species which we have reasons to range under this subgenus (*P. corticaria* Say, *arizonensis* W. G. B.). But in general they are remarkably constant throughout the whole group which extends over North, Central and the northern coast of South America, the West Indies and Bermuda, Eastern Asia, and the islands of the Pacific and Indian Seas. Europe has no recent forms ranging in the group; but there is a fossil one, *P. lamellidens* from the miocene of Turovitz, Bohemia, closely allied to our *P. contracta* Say.

The species have been ranged under different subgenera, such as *Pupilla*, *Leucochila*, which neither comprise the whole group, nor are homogeneous in themselves, and which can only gain by the removal of these forms.

There are several distinct groups of which peculiar characters, the range of distribution and the species will be stated in the following.¹

¹ Conf. Nautilus, VI, p. 4. The species enumerated there will be omitted here; and so will other species which I do not know well enough as to their identity, or their position.

1. Section: *Privatula*. North America.

Shell cylindric; lamellæ few and small or none.

Type: *P. corticaria* Say.

2. Section: *Eubifidaria* (Bif. s. str.). America, Polynesia.

Shell cylindric to turriculate; lamellæ typical.

Type: *P. hordeacea* Gabb.

P. barbadensis Küst (W. I.)

P. grevillei Chitty (W. I.) and numerous others.

P. exigua Ad. Mauritius.

3. Section: *Boysidia*.¹ Asia, Polynesia.

Shell conic; aperture very peripheric; lamellæ typical.

Type: *P. hunana* Grdl. (China.)

P. strophostoma Mildff. (Philippines.)

4. Section: *Albinula*. America, Asia, Polynesia.

Shell oblong or conic-ovate or cylindrical, colorless (contains rather various forms and should be divided in groups.)

Type: *P. contracta* Say.

P. armigerella Reinh. (China.)

P. recondita Tapp.-Can. (Japan.)

P. pediculus Shuttl. (Japan, Samoa.)

P. artensis Montrz. (New Caledonia.)

P. meridionalis Mildff. (From description; China.)

5. Section: *Vertigopsis*. North America.

Shell small, vertigo-like, albino; parietal lamellæ rather short and almost simple; palatals near the margin.

Type: *P. curvidens* Gld.

* * *

So much for the shells. Of the soft parts very little is known as yet. But it is probable that further investigations will prove the relations shown by the shells, which in general yield true evidences of the natural position of their bearers.

¹ Boettger, in v. Mœllendorff (Jahrb. Mal. Ges., 1884, p. 180, 181) proposes the subgeneric name Gredleriella; but Gredler himself sent me specimens with the above. Dr. v. Mœllendorff ranges the group next to Scopelophila (*P. kokeili* Rssm. and *Rossmassleri* Schm.); but the resemblance is only external, from the conic shape of the shells. In the configuration of the apertural parts and especially the lamellæ it closely resembles *P. contracta* Say, while in Scopelophila they are of quite a different type and wholly marginal.

SHELLS OF WILLIAM'S CAÑON, COLORADO.

BY F. A. SAMPSON, SEDALIA, MO.

Fifteen years ago and again the past summer, I collected shells in William's Cañon at Manitou. On the first visit I asked a specimen dealer if there were any land shells in the vicinity. He said there were no living ones: that he had hunted for specimens over the mountains for years, but had never seen one, though there were dead shells on the side of the mountain near by. I found the dead shells, and also plenty of living *Patula strigosa*, in numbers more abundant than at the latter visit. At that time I had not noticed that Binney's Manual gave *P. hemphilli* as occurring at the same place, else I would have made diligent search for it, though I do not think it will be found there. It seems hardly probable that the young of *strigosa* were mistaken for *hemphilli*, though the shells of four whorls are strongly carinated like *hemphilli*, while the mature shells of five whorls do not show any carina. Cockerell in NAUTILUS, Vol. III, p. 102, thinks the finding of *hemphilli* in the Cañon needs confirmation.

Cockerell states that these shells are typical *cooperi*. They are certainly less elevated than Fig. 152 of Binney's Manual. They are more like Fig. 153 except that they have the two bands shown in Fig. 152, and are not carinated at the commencement of the body whorl. Some of them have the heavy raised callus connecting the extremities of the peristome.

On the rocky ledges by the road side in the Cañon, I gathered a number of small shells, all of them being dead. Had the day not been excessively hot I might probably have found living ones.

The following will show the species and the number found of each:

75. *Patula strigosa cooperi* W. G. B.
9. *Zonites arboreus* Say.
28. *Vallonia pulchella costata* Müller.
18. *Ferussacia subcylindrica* Linn.
5. *Pupa* undetermined.
1. *Pupa hordeacea* Gabb.

POST PLIOCENE SHELLS.

BY O. A. CRANDALL, SEDALIA, MO.

While at Belten, Texas, a short time ago, I discovered great numbers of semi-fossil shells embedded in the clays that were probably formed during the early quarternary period. They are distributed through the clay from two to six feet below the surface and may be seen sticking in the banks at any place along the valley of Nolan Creek where a gully has been washed out. The land is covered with large trees, but the best evidence of the age of the formation is seen in the bed of the creek where the water has worn a channel in the solid limestone rock over which it flows from two to three feet deep. The clay and soil of the valley must have been deposited there before or about the time the creek formed its present channel, many, many hundred years ago. The clay has preserved the shells, in nearly as good condition (except as to color) as when buried; and those found at the greatest depth are in the best condition.

I collected the following species:

Bulimulus dealbatus Say.

Bulimulus schiedianus Pfr.

Zonites friabilis W. G. B.

Zonites—probably an undescribed species.

Patula alternata mordax Shutt.

Helix Rœmeri Pfr. var. *umbilicus* closed.

Helix Rœmeri Pfr. var. *umbilicus* closed and toothless.

Helix Texasiana Moricand.

Helix Mooreana W. G. B.

Helix Leaii Ward.

Helix Berlandieriana Moricand.

Helicina orbiculata Say.

Planorbis bicarinata Say.

Planorbis—probably an undescribed species.

Limnea umbilicata Adams.

Physa Halei Lea.

Physa—probably an undescribed species.

ON ACANTHOPLEURA AND ITS SUBGENERA.

BY H. A. PILSBRY.

In studying the species of this abundant group of Chitons, the writer found the scheme of subgenera adopted by the late Dr. Carpenter and published by Dall¹ to be in several respects both insufficient and faulty. These defects are partly due to the fact that Carpenter's studies on this portion of the Chitons were left incomplete by his untimely death, and partly to his rather lax usage in questions of nomenclature.

Acanthopleura, as a whole, is much more closely allied to *Tonicia* than to any other genus. It has no close alliance with the other genera grouped by Carpenter in "Acanthoidea." It agrees with *Tonicia* in having certain areas on the valves studded with minute eyes, which possess a crystalline lens, and are not especially different from lower mollusk eyes generally. *Acanthopleura* differs from *Tonicia* in having these eyes scattered about the bases of the tubercles on the shell, instead of being arranged in radiating series as in *Tonicia*. The eyes are visible under a good hand lens as minute shining black sunken dots or transparent jewel-like raised drops.

Carpenter supposed the West Indian species, *Ch. piceus*, to be the type of *Acanthopleura*; but in Guilding's original paper no species of that group of forms is mentioned by name. A critical review of the subject compels us to accept *Ch. spinosus* Brug. as the type of *Acanthopleura*. The subgenera will stand as follows:

(1) *Acanthopleura* Guild., (restricted.)

Valves somewhat immersed; posterior valve having a very long insertion-plate, cut into numerous teeth by short slits; intermediate valves with one or two slits; sinus smooth; girdle covered with long spines. Type *Ch. spinosus* Brug. *Francisia* Cpr. is a synonym.

The immersion of the valves gives the tail-valve, when detached, the appearance of that of *Katherina tunicata*.

(2) *Maugeria* Gray, (restricted.)

Posterior valve having the pectinated insertion plate, cut into numerous teeth by slits similar to those of the head-valve. Median

¹ Proc. U. S. Nat. Mus. 1881, p. 284.

valves 1-slit; *sinus smooth*, not toothed; girdle densely, closely clothed with short calcareous spinelets. Type *Ch. piceus*, of West Indian coasts. This group is *Acanthopleura* of Cpr., not Guilding.

(3) *Amphitomura* (s. g. nov.)

Posterior valve having the insertion-plate very short, with blunt, crenulated edge, interrupted only by a *single mopaloid slit on each side*; median valves 1-slit; *sinus smooth*; girdle as in s. g. *Maugeria*. Type *Ch. borbonicus* Desh. The tail-valve alone differs from *Maugeria*, but this character is so significant and so strongly developed that the necessity of separating the two subgenera is obvious.

(4) *Mesotomura* (n. nov.)

Posterior valve having the long insertion plate deeply pectinated outside, its edge interrupted only by a *single median-posterior slit*; median valves 1-slit; *sinus denticulate*; girdle sparsely set with spike-like spines. Type *C. echinatum* Barnes. *Corephium* Gray, 1847, not Browne, 1827, is a synonym.

Mention should be made of the curious fact that Gould's *Ch. incanus* and the similar Japanese species *C. japonicus* Lischke, have been by all authors referred to *Acanthopleura*. An examination shows them to differ wholly in the characters of the tail-valve, the *incanus*, etc., having a smooth crescentic callus in place of the insertion-teeth. It therefore belongs in the immediate vicinity of *Onithochiton*, from which it differs in the spiny girdle and rough exterior. The group may be called *LIOLOPHURA*, *Ch. japonicus* being the type.

A NEW TROCHID FROM JAPAN.

BY H. A. PILSBRY.

Calliostoma Crumpii, n. sp. (pl. I, fig. 3.)

Shell closely resembling *C. argenteonitens* Lischke (Manual of Conchology xi, pl. 63, fig. 32) in contour, color and texture. Differing from that species in the more convex whorls of the spire, the deeply channelled suture, and in sculpture. The body-whorl is rounded, and has a girdle of prominent tubercles at the periphery;

above this is another similar girdle of tubercles, occupying the place of the supra-peripheral series of knobs in *C. argenteonitens*. The deep, channelled suture is bordered by a necklace of beads. The base has six encircling carinae, like those of *argenteonitens* but more distinctly beaded. The whorls of the spire show the two prominent series of tubercles, and the subsutural row; the beads of the latter sometimes duplicated. Aperture round, oblique, the outer lip slightly expanded; columella and parietal lips regularly arcuate, pearly. Interior silvery, with the reflections of opal. Alt. 31, diam. 26, oblique alt. of aperture 17 mill.

Habitat, Japan.

This is one of the most exquisitely beautiful shells of this family. It differs markedly from *C. argenteonitens* in having a double row of prominent bosses or tubercles. The opaline hues of the nacre shine faintly through the thin, duller whitish outer layer; and the aperture is iridescent with the most intense red and emerald reflections. The specimen is from the collection of Mr. Shelley G. Crump, of Pittsford, N. Y., who is making a special study of *Trochidae* and *Turbinidae*, and in whose honor the species is named.

It should be noted that *Trochus moniliferus* Lmk. placed in *Calliostoma* in my monograph of this family in the Manual of Conchology, really belongs to the subgenus *Eutrochus*, but Fischer has instituted a section *Lischkeia* for it. A very fine typical specimen of this species is in the collection of Mr. Crump.

NOTES AND NEWS.

NOTE ON *CONULUS STERKII* Dall.—In Proc. U. S. Nat. Mus. vol. xi, 1888, p. 214, Dall published the description of a n. sp. of *Hyalinia* which he called *H. sterkii*. The description was copied in NAUTILUS V, p. 10, without a name. The figures represent fairly well the form, except Fig. 3 which shows the spire too high. As Mr. Dall justly supposed, it is a true *Conulus*, which genus has since been confirmed as being distinct from *Hyalinia* by anatomic characters (Dr. v. Ihering and others). In 1891, I examined jaw and radula of a dried specimen, softened, and could not obtain the radula in its totality: now, as there is no hope to have any fresh examples before next year, I publish the general result. The jaw is of nearly exactly

the same shape as that of *Con. fulvus*, only the upper edge more equally rounded, 0,036 mm. wide, while that of *fulvus* measures 0,024. (Specimen from New Philadelphia). Radula: the central tooth is comparatively large, tricuspid; laterals 5, tricuspid, similar to the central; marginals 8 (and probably more) tricuspid, formed as in *C. fulvus*. The shell presents, under the microscope, the same peculiar aspect as that of *fulvus*.—*Sterki, New Philadelphia, O.*

MR. HUGH FULTON has recently purchased the collection of the late A. Morelet, containing a large number of rare species, especially land shells of Africa and adjacent islands.

SUBULINA OCTONA, a West Indian snail, has been detected by Mr. Robert Walton, in a green-house at Roxborough, Philadelphia. It seems to be well established there, having been found for several years, in considerable numbers.

MR. T. WAYLAND VAUGHAN, the well-known Texas and Louisiana Conchologist, is studying at Harvard University.

THE PROPOSAL TO REPRINT the "*Conchologists Exchange*," noticed in our last issue, has met with quite a favorable reception; but the number of subscribers is still insufficient to warrant its publication. The reprinting and price will depend entirely upon the number of subscriptions.

MR. T. T. WOODRUFF, of Boston, has recently purchased the collection of Dr. Tryon, of Buffalo (3000 species), which he intends to display in the West.

During the past month, the Conchologists of Philadelphia have had the pleasure of meeting quite a number of the Conchological fraternity from other cities. Early in the month Professor O. B. JOHNSON, of Seattle, Wash., stopped a few days at Philadelphia and later at Washington, on his way southward. MR. JOHN RITCHIE, JR., of Boston is in Philadelphia to stay several weeks. MR. W. J. RAYMOND, of Oakland, Cal., who is studying Physics at Johns Hopkins University, Baltimore, was with us a day or two, the guest of Mr. Ford. Messrs. SIMPSON and HENDERSON, of Washington, D. C., spent a few days with their friends in Philadelphia, and also made a flying trip to New York City, during the holidays. MR. S., as usual, would admire nothing so much as the dingiest sort of clams. MR. I. GREGOR, of Jacksonville, Fla., was also in the city early in the month. Mr. S. Raymond Roberts spent New Year day at the Academy with his old associates. And finally, our friend

C. E. BEECHER, of Yale College Museum, called upon us for only about ten minutes, but we had time to ask, how was his collection of recent *Brachiopoda* coming on? And to hear that he had about 80 out of the 130 or so known species, and is still trying for more.

DR. J. S. NEWBERRY, who has been professor of Geology and Paleontology in Columbia College, New York City, for twenty-two years, died at New Haven, Conn., Dec. 7, 1892.

EXCHANGES.

Will some of the members of the A. A. of C. kindly send me some LIVING species of *Helix* for my snailery? Zonites not wanted, as they cannot survive the trip across the continent. The favor will be fully appreciated and receipt of specimens acknowledged.—Willard M. Wood, 2817 Clay St., San Francisco, Cal.

SHELLS and books to exchange. Send lists, and receive mine.—Chas. Le R. Wheeler, Damascus, Pa.

WANTED, by purchase or exchange,—good specimens of *Anodonta Ferrussaciana* Lea, size immaterial provided beaks are perfect.—Bryant Walker, 18 Moffat Bld., Detroit, Mich.

WANTED. Works on Land Shells, and rare North American and Foreign Helices. OFFERED, *Mesodon dentiferus*, *Sayii*, *Acanthinula harpa*, etc.—A. W. Hanham, Bank of British North America, Quebec, Canada.

TO EXCHANGE in large or small quantities. *Anodonta suborbiculata* Say and *Anodonta corpiculenta* Cooper, also about 40 species of the fine Spoon river Uniones and univalves.—Dr. W. S. Ströde, Lewistown, Ill.

EXCHANGE. *Unios heterodon* Lea, *lanceolatus* Lea, *Tappanianus* Lea, *Anodonta Williamsii* Lea and *Marg. undulata* Say (pink var.) for other *Unios* not in my collection.—W. T. Farrer, Orange, Va.

THE NAUTILUS.

VOL. VI.

FEBRUARY, 1893.

No. 10

ADDITIONAL SHELLS FROM THE COAST OF SOUTHERN BRAZIL.

BY WM. H. DALL.

In the NAUTILUS for August, 1891, (V, p. 43) the writer enumerated fifty-five species of marine mollusks from the southern coast of Brazil, mostly collected by Dr. H. v. Ihering, which greatly extended the known range of many familiar species of the eastern coast of the United States. A second list is now presented which considerably enlarges the number of North American and Antillean species known to extend to the region mentioned. Among the land and fresh-water species, *Zonites arboreus* Say was a surprise, as well as a shell which appears not to differ from *Vertigo antirevigo* of Europe.

Columbella lyrata Sby. described from the Bay of Panama had previously been identified by Dunker among species from Santa Caterina, Brazil, and is now sent from Bahia by Safford. *C. terpsichore*, which is a common species in Ceylon and has been received from several Indo-Pacific localities, was reported from Barbados by Cuming and now turns up at Bahia. *Labiosa lineata* Say is a surprise from San Paulo, and so is *Lucinopsis tenuis* Recluz. Several of the Patagonian forms are shown to extend further north than was supposed. The species now reported were chiefly collected by Dr. v. Ihering at San Paulo (S. P.) on the tropic of Capricorn, Montevideo (S. Lat. 35°), Rio Grande do Sul (R. G. S.) in S. Lat. 32°, 30', Santa Caterina (S. C.) in S. Lat. 26°, and Bahia in S. Lat. 13°

30'. Others were sent by Ensign Safford, U. S. N. from Maldonado, Uruguay, and Bahia. In this connection attention may be called to the list of shells from Fernando Noronha in the Linnean Society's Journal (Zool. xx, pp. 483-503, 1890) by Mr. Edgar A. Smith of the British Museum. This list is not a long one but the same tendency is obvious there, as in our present lists, for the Antillean species to range far southward. Thorough dredging along the coast would doubtless greatly enlarge the lists both of local and Antillean species. In the following list, which is strictly supplementary to that of 1891, some of the species are extended southward from their most southern previously known range nearly three thousand miles! A few species were sent by Dr. W. H. Rush, U. S. N., in May, 1892, which were dredged in Maldonado Bay near the mouth of the La Plata in 3-6 fathoms mud. Those belonging to the northern fauna have been added to make the supplement as complete as possible.

Ostrea æquinoctialis Orb.? worn, R. G. S.

Plicatula ramosa Lam. S. P.

Spondylus croceus (Chemn.) Reeve S. P.

Pecten (*Janira*) *ziczac* Lin. S. P.

Margaritophora radiata Lam. S. P.

Mytilus canaliculus Hanley S. C.

Mytilus exiguus Dkr. S. P.

Arca candida Chemn. S. P.

Arca auriculata Lam. S. P.

Arca incongrua var. *brasiliensis* Orb. S. C., R. Y. S., S. P.

Arca Orbigny Kobelt (*rhombea* auct.) S. P.

Leda electa A. Ad. S. P.

Chama arcinella Lin. S. P.

Cardium muricatum Lin. S. P.

Venus subrostrata Lam. S. P.

Venus circinata Lam. S. P.

Venus purpurata Lam. R. G. S.

Venus pectorina Lam. S. P., fossil.

Meretrix rostrata Koch. S. P.

Meretrix texasiana Dall? S. P.

Tivela mactroides Born S. C.

Tivela Iheringi Dall, S. P.

Tivela bicolor Gray, var. S. C.

Lucinopsis tenuis Recluz S. P.

Petricola robusta Sby., Bahia.

- Heterodonax bimaculata* Lin.
Tagelus gibbus Spgl., Maldonado.
Tellina striatula Lam. S. P.
Macha Cumingiana Dkr. S. P.
Mactra brasiliiana Lam. S. P.
Mactra exalbida? worn, S. P.
Mactra eleryana Orb. short var. S. P.; long var. S. C.
Mactra patagonica Orb. R. G. S.
Labiosa lineata Say, S. P.
Corbula caribæa Orb., Maldonado, Rush.
Azara prisca von Martens, (fossil) S. P.
Azara ochreata Hds., Montevideo.
Azara labiata Gray, Montevideo.
Barnea costata Lin. S. P.
Dentalium (? *eburneum* Desh. worn) S. P.
Cylichnella biplicata Lea, Maldonado, Rush.
Bulla striata Brug. S. P.
Terebra cinerea Born, S. P., Bahia.
Terebra patagonica Orb. S. P.
Olivancillaria auricularia L., Maldonado, R. G. S.
Olivancillaria var.? *pallida* Swains., M. Bahia.
Olivancillaria contortoplicata Rve. R. G. S.
Olivancillaria Deshayesiana Duclos, R. G. S.
Olivella mutica Say, var. *petiolita* Duclos, Bahia, S. P.
Scaphella angulata Lam. R. G. S.
Lencozonia ocellata Gmel. Bahia.
Anachis terpsichore Leathes. Bahia.
Anachis lyrata Sby. Bahia.
Columbella mercatoria L. Bahia.
Bullia (*Buccinanops*) *cochlidium* Kiener, R. G. S.
Ocenebra Haneti Petit, Montevideo.
Purpura hæmastoma L., Maldonado.
Purpura hæmastoma var. *Consul*, Lam. R. G. S.
Purpura hæmastoma var. *inermis* Rve. S. C.
Purpura hæmastoma var. *Floridana* Conr. S. C., Bahia.
Scala Orbigny Nyst. R. G. S.
Ianthina exigua Lam. S. P.
Dolium galea Lin. R. G. S.
Simnia deflexa Sby. S. P.
Strombus pugilis L. S. C.

Crepidula aculeata Gmel. R. G. S., Maldonado (Rush.)

Crepidula fornicata Lin. R. G. S.

Sigaretus maculatus Say, S. C.

Acmæa onychina Gld., S. P. Maldonado.

Astraliu olfersi Troschel, S. P.

Astraliu latispina Phil., S. P.

Omphalius viridulus Gmel. var. *brasiliensis* Mke. S. P.

Omphalius patagonicus Orb., Maldonado.

Lucapinella adspersa Phil. S. P.

Fissuridea barbadensis var. *rosea* Gmel. S. P.

Fissuridea patagonica Orb., Maldonado.

DESCRIPTION OF A NEW FORM OF CYPRÆA.

BY JOHN FORD.

Cypræa cruenta Gmel. var. *Greegori* n. var.

Shell depressed, orbicular-oval in form, heavily calloused on the sides and ends. Callus on the sides light salmon in color, with irregular purple-brown spots, having a blotchy appearance. Dorsal surface similar to that of *cruenta*, but lacking the whitish spots typically present in that species. Base spotless, salmon colored, darkest in the interstices. Teeth on outer lip very strong, long and whitish; on inner lip finer, with the exception of the anterior fold, and the adjacent tooth, both of which are very prominent. Space between the anterior fold and the following tooth wide and bright red; posterior teeth of inner lip prolonged outward upon the base.

Dimensions of an average specimen: length $1\frac{1}{4}$, breadth $\frac{7}{8}$ inch.

At a glance this shell appears somewhat related to *C. caurica* Linn., but a careful examination will show that it is entirely distinct from that species, the columella of *caurica* being more concave, and the anterior fold bifid in character; the following tooth of *caurica* also is less prominent, and the form and color of the species altogether different.

This variety differs from *C. cruenta* in being smaller, more rounded in form, entirely lacking spots on the base, and in the peculiar variations of the teeth as described above.

While most students would probably consider var. *Greegori* a distinct species, I am inclined to believe it too closely related to *C.*

eruenta for unquestionable specific distinction. The form has not been known, at least to American collectors, until very recently.

The shell bears the name of my good friend Mr. Isaiah Greeger, of Cuyahoga Falls, Ohio, an untiring collector and student of shells.

THE UNIO MUDDLE.

BY BERLIN H. WRIGHT.

For the past fifteen years my father and myself have been making a study of the family Unionidæ and have brought together something like 700 species. Like many others we have often been greatly perplexed to know where to place a form, being frequently reminded of what a celebrated paleontologist once wrote me regarding a certain gastropod. "It is — — but if it had lived a little longer it would have been — —"

Several years ago we brought to New York the results of four years hard collecting in South Florida, several bushels of Unios. The perplexing part of the work was commenced, having in hand a figure or description or both of almost every species of the family. All of the shells belonging to the *trossulus* group were placed upon a large table. There was *U. amygdalum* Lea, *lepidus* Gould, *modioliformis* Lea, and *trossulus* Lea. Then with the figures and descriptions of these species before us, we selected a few perfectly typical individuals of each species and undertook the task of dividing the mass of material into four groups corresponding with the above-named species. There were not less than 500 individuals, all cleaned and taken alive. Many days were spent in this work. At the close of the day we would congratulate ourselves that they were correctly divided and the next day on reviewing the work make many changes, until, at last, we gave up in despair and have never dared to send many of them out—only the extreme forms being thus far used.

Then the work of dividing the others in the same manner was undertaken. Typical specimens of various ages and differing sexes of the following species were selected. *U. Buckleyi* Lea, *Jayanus* Lea, *Anthonyi* Lea, *Buddianus* Lea, *aheneus* Lea, *Blandingianus* Lea, *coruscus* Gould (comparison having been made with the type at Albany), *fuscatus* Lea, *Jewettii* Lea, *minor* Lea, *Monroensis* Lea

(here let me say that I have traversed every inch of the shore of *L. Monroe*, dredging in scores of places in the lake and adjacent streams and never found a perfectly typical specimen of this species), *occultus* Lea, and *papyraceus* Gould, the last a specimen loaned from the Newcomb collection. When we finished, thousands of specimens remained that could not well be placed with any of the groups. These were divided into groups and further search made among the various authorities at hand to discover their identity. After eliminating all possible, many interesting forms remained, represented by large numbers of individuals. These we desired to classify and use in exchanges, and names we must have for them. We reasoned thus: The water system of South Florida is in no way connected with Georgia or the States north, the rivers flowing *northward* instead of southward; many of these forms are found in isolated lakes or ponds; large numbers of our known species described by Lea, Conrad and others from a single individual, sometimes a single valve only and rarely more than a small suite being at hand; some of the oldest known species have never been found outside of the original station. These facts justify us in erecting into species such well marked forms as are well represented in these unknown lots. Accordingly this was done and now I am censured for not having given the matter sufficient study. Will those who claim to know, tell us through the NAUTILUS how they arrive at such definite and positive conclusions regarding the genuineness of some of my own and other's species? Will the censor name the exact characteristics of any species? Information of this sort will be hailed with wild delight by all working naturalists, and the name of the discoverer will always be held in grateful remembrance by all lovers of science. We wait.

I believe there can be no safe middle ground. It is either true that there is but one species in the family or else most of the described species must stand as good.

In the U. S. the *Anodon* graduates by imperceptible stages into the *Margaritana* and that into the *Unio*.

We once found a lot of shells in a Pennsylvania stream that bothered us greatly, and the late Dr. Wesley Newcomb pronounced them a cross between *An. undulata* Say, and *U. pressus* Lea. Exteriorly they were the latter but interiorly the former. This suggests the law of hybridization. Distinguished authorities tell us that members of the same species only are fertile; the crosses in some rare cases prov-

ing fertile only for a generation or two. Crosses of *widely differing* forms or races are *very* fertile, but sterility is the law with members of the same family but of *differing species*. Has this test been applied to the family Unionidæ? This seems to be the only way the *true* boundaries of species will be fixed.

It can be asserted without fear of successful contradiction that the members of this family (Unionidæ) are connected in such a manner that it is impossible to draw a limit to any species. The same is true in many other families, recent and fossil, as the Ammonites, snails, sponges, etc. Is it not true that species are mutable, similar conditions and surroundings only yielding like forms? Dr. Newcomb, to settle a dispute, reared from a single pair, five species (?) of Achatinella, their surroundings being varied to produce the desired change. The most cautious recent investigators incline to the theory of mutability of species. The wild dog has descended from the wolf; the domestic dog in all its forms from the wild dog; the domestic cat from the wild cat and the pet guinea-pigs from the wild guinea-pig of Brazil. The domestic forms of these will not pair with ancestors, the new *species* being evolved by differing conditions.

Hence it is that almost every branch of Zoology is burdened with synonymy and is in great confusion. The only practical course for the purpose of classification and study of Natural History is to admit that the principal well characterized forms are species. There is no other course open to us and I have concluded from this process of reasoning that Lea's, Conrad's and others' names, where based on well characterized and differing forms as exhibited in numerous individuals, will have to stand as "good species" in spite of the dictum of individuals. This must be the case or the very foundation of all Natural Science will be destroyed and systemization be impossible. It, therefore behooves us to exercise much caution in our strictures upon the work of others especially where we have not the means of knowing the facilities possessed by the one with whom we differ.

Regarding the classification of the family Unionidæ, I think Dr. Lea's Synopsis a pretty close approximation to what we want. By making some changes it becomes a most useful adjunct to the cabinet. It enables the student to hunt down a species by the process of elimination very expeditiously. I have found some changes and additions expedient. The habitat is entered opposite each species as also a reference to the work, page and plate where it is

described, together with marginal notes of allied species, and all the species described since the last edition was published are entered in their proper place as indicated by the author. A new edition of this work is what we need and not any sweeping change in the arrangement of species.

ON *CLEMENTIA SUBDIAPHANA* CPR. IN SAN PEDRO BAY.

BY MRS. BURTON WILLIAMSON.

To a collector interested in the geographical distribution of shells, the occurrence of species in distinct areas, is full of interest, even though it may modify his preconceived notions regarding defined limits of certain species.

In Dr. Wm. H. Dall's work, "On some New or Interesting West American Shells," (From Proc. U. S. Nat. Mus., Vol. XIV), he reports the dredging of *Clementia subdiaphana* Cpr., near San Francisco Bay, in 24 fms. The writer says, "the locality whence the specimen was obtained is 600 miles farther south than before reported." The habitat of this species was Vancouver Island and Puget Sound, until Dr. Dall dredged it from Port Etches and southward on the Alaskan coast. A small valve of *Clementia subdiaphana* has recently been collected in San Pedro Bay, by Mrs. Laura H. Trowbridge. Mrs. Trowbridge found it on the beach and sent it to me for identification. As nothing like it had been collected in San Pedro Bay, to my knowledge, I sent the interesting specimen to Dr. Dall for determination. He writes; "looking over some material now on hand, I find young specimens from among my dredgings of 1873 at Catalina Island, and a young one dredged in 1890 off Santa Barbara by the Fish Commission, thus fully confirming the extension southward." This extends the species 500 miles farther south.

DESCRIPTION OF A NEW SPECIES OF *BULIMUS*.

BY HENRY A. PILSBRY.

Placostylus alienus n. sp.

Shell subcylindrical, with conical spire, very solid, the body-whorl buff, spire tawny. Whorls $4\frac{1}{2}$, convex. Aperture slightly exceeding half the total length of the shell, somewhat oblique, oblong ovate, whitish inside becoming orange toward the lip; per-

istome very heavily calloused within, the callus orange; face of the lip convex, thickened, a little expanded; columella arcuate, reflexed, having a strong fold above the middle, produced by a strong crescentic ridge which encircles the columella immediately behind the reflexed columellar lip. There is a shallow peripheral sulcus upon the latter third of the body-whorl.

Alt. 29, diam. $14\frac{1}{2}$ mill.; alt. of aperture $16\frac{1}{2}$, width 10 mill., inclusive of peristome.

Habitat, New Hebrides.

This species was sent to me by Dr. J. C. Cox of Sydney, N. S. W. Australia. It seems to be quite distinct from any of the described forms. In some characters it resembles the genus *Diplomorpha*, and Dr. Cox suggests that it may belong to that group; but the balance of characters seem to me in favor of *Placostylus*.

Dr. Cox writes "I have only recently received this, to me, quite a new species of shell, and fancy it belongs rather to the genus *Diplomorpha* than to *Bulimus*. I have one specimen with a thin brown epidermis on it, another with the mouth quite pale colored."

NOTES ON THE HELICES OF THE BIOLOGIA CENTRALI-AMERICANA.

BY H. A. PILSBRY.

Dr. von Marten's work on the land shells of Middle America, now in course of publication in Godman and Salvin's magnificent work, *Biologia Centrali-Americana*, promises to rank as one of the great faunal works of our time. Coming after Crosse and Fischer's elaborate and beautiful volume, it is naturally more complete, and to a great degree supplements the work of the French authors.

The last parts of the *Biologia* issued contain a portion of the account of the Helices, and as a résumé of the principal points of classification will be of interest to specialists, the writer has ventured to briefly pass them in review.

v. Martens recognizes *PATULA* as a genus, and in it he includes the sections *Thysanophora* and *Microconus*.

In the genus *HELIX* the following subgenera are adopted: *Acanthinula*, *Vallonia*, *Trichodiscina*, *Praticolella*, *Arionta*, *Pomatia*, *Lysinoë*, *Oxychona*, and *Solaropsis*. In the subgenus *Acanthinula* are included the minute, conical-globose, narrowly umbilicated forms for which the writer some years ago proposed the name *Ptychopatula*. These forms seem to me to be nothing more than nar-

rowly perforated *Patula*, having no especial relations to *Acanthinula*. The jaw and dentition of *A. granum* Strebel are like the thin-shelled Mexican *Patulas*, not at all like *Acanthinula*. The subgenus *Trichodiscina* Martens (= *Trichodisus* Strebel, preoc.) includes the forms grouping around *H. coactiliata* Fér. The very peculiar species *H. macneili* Crosse is included with doubt. If it really belongs here, the name *Averellia* Ancey, 1887 (type *H. macneili*) will take precedence over *Trichodiscina*. In 1889 the writer from a study of specimens collected by Gabb, referred this species to *Cepolis*, although not without doubt.

(to be continued.)

NOTES AND NOTICES.

ZONITES STERKII Dall.—I collected this species last Spring near Mt. Lebanon, La., under damp leaves. Dr. Sterki kindly determined the specimens for me.—*T. Wayland Vaughan*.

NOTES ON THE UNIONIDÆ OF FLORIDA AND THE SOUTHEASTERN STATES, by Charles T. Simpson, Aid in the Dept. of Mollusks, U. S. National Mus. (32 pp., 26 pl. extract from Proc. U. S. Nat. Mus. XV). In this critical study of the mussels of the southeast drainage we find much to commend. Mr. Simpson discusses their distribution, dividing our area into two regions, one the Mississippi Valley with the Texas and eastern Mexican area as a subregion, the other region comprising the States bordering on the Gulf of Mexico from the Mississippi to Florida, and the Atlantic drainage north to Canada, and also including the St. Lawrence (Great Lake) drainage. In this second region, the specific forms are comparatively few and much less diversified in character than in the Mississippi drainage. One of the most ubiquitous types is *Unio complanatus*, which extends, with variations, throughout the system.

Lea's well-known *classification* of *Unio* is criticised and designated as "artificial and not in accordance with all the facts of nature;" and in this conclusion we heartily join Mr. Simpson. The arrangement of Lea was a temporary expedient only, and bears about the same relation to a natural system that the arbitrary systematic botany of Linnaeus bears to the modern natural system of plants. The species are classified into "groups" by Mr. Simpson; and under each one are given the synonyms, as he understands them, with notes on distribution, and the salient specific characters of each are pointed out. These notes, with the characteristic and generally

very good outline figures of all the species, will be of the greatest use to students of the Uniones of this region. The synonymy given under some species, such as *U. buckleyi*, *obesus*, etc. is rather alarmingly extensive, and some of his conclusions may cause our Unio-specialists to hurl (verbal) missiles at Mr. S.'s devoted head, "just to show there's no ill feeling;" but the Uniologist must learn to dodge these little things or take them in good part, as they are all incident to the pursuit of a noble science. One new species, *U. subluridus*, is described, from Orange Springs, Volusia Co., Fla. We are sorry to see that by some oversight, Mr. S. has given to Lea the beautiful *Anodonta* of the Florida lakes. It was previously described by Thomas Say, and attains a much larger size than the figures given by Lea or Simpson.—*H. A. P.*

CYPRÆA CHRYSALIS Kiener.—This species, which apparently has not been seen by REEVE, SOWERBY and ROBERTS, who quote their descriptions from KIENER, is commented upon and described by MELVILL in the October number of the *Journal of Conchology*, issued last month. He places the species between *irrorata* Sol. and *quadrimaculata* Gray; and it is considered by him a good species, possessing some of the attributes of the *C. fimbriata* Gmel. var. *microdon* Gray, some of *C. (Naria) irrorata* Gray, and others of *quadrimaculata* Gray, but differs from all in the produced extremities.

CYPRÆA AMPHITHALES Melv. is also discussed in the same paper, a more perfect specimen than the type having been obtained from Port Elizabeth, S. Africa. This species has the characters of *Cypræovula*, combined with those of "*Luponia*" *algoensis*. It has lately been figured by Sowerby in "The Marine Shells of South Africa," pl. 5, figs. 94-96.

POST PLIOCENE SHELLS.—In the January NAUTILUS, p. 103, a list of semi-fossil shells from Belten, Texas, is given. The *Zonites* mentioned without specific name is a large form of *Z. indentatus* Say. The *Planorbis* is *trivolis*; and the *Physa* is a very slender form, like a small *Aplexa hypnorum*, or the slenderest sort of a *Ph. pomilia* Con. It seems to be new, but is represented in Mr. Crandall's collection by a single specimen.

SPIRULA FRAGILIS FOUND ON THE BEACH NEAR GAY HEAD, MASS.—The stranding of *Spirula fragilis* on Nantucket has been described in Binney and Gould's Invertebrates of Massachusetts. It may be of interest as showing the further distribution of this little

cephalopod to note two specimens of the dried internal shells of this species found by Dr. Aug. F. Foerste and myself on the sandy beach between Gay Head light-house and Squibnocket, in August, 1889. The specimens lay on the surface together, above high tide mark, are the only examples which I have seen from the island of Martha's Vineyard. One of the specimens, which I have lately deposited in the collection of the Boston Society of Natural History, was broken anteriorly and the protoconch was missing.—*J. B. Woodworth.*

Cambridge, Mass., January 21st., 1893.

NEWSPAPER CONCHOLOGY.—The gloriously free daily press of this country does not often discuss scientific matters, but when it does, *facts* are apt to be mangled. The following clipping is not so bad: "It is generally supposed to be a sign of wet weather when snails go about without their shells. One species of snail never takes its walks abroad except when rain is at hand. Some climb trees two days before a down fall, setting upon the upper side of the leaves if a storm is to be of short duration, but taking shelter on the under side if it is to last some time. Still other snails turn yellow before rain, and blue when it is over."

MR. JOHN WALTON, formerly of Ward's Natural Science Establishment, Rochester, N. Y., is now employed as Artist in the Biological Department of the University of Chicago, and his address in future will be *Science Hall, University of Chicago, Chicago, Ill.*

THE DEATH OF RICHARD OWEN, the great anatomist, has been announced.

MR. ISAAC MARTINDALE, well-known as a botanist and entomologist, and treasurer of the Academy of Natural Sciences of Philadelphia, died at his home in Camden on January 10th.

AT THE ANNUAL election of the Conchological Section Academy Natural Sciences of Philadelphia, the following officers were chosen: Director, W. S. W. Ruschenberger; Vice Director, John Ford; Secretary, Edw. J. Nolan; Treasurer, S. Raymond Roberts; Conservator, Henry A. Pilsbry.

EXCHANGES.

LAND AND FRESH-WATER SHELLS to exchange for shells from any other locality.—*Morris Schick, 2349 Fairhill St., Philadelphia, Pa.*

TO EXCHANGE: Fine fossils for Foreign or rare North American Helices. Also wanted, "Manual of American Land Shells" by W. G. Binney, 1885.—*C. S. Hodgson, Albion, Illinois.*

THE NAUTILUS.

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No. 11

OBSERVATIONS ON THE HELICES OF NEW ZEALAND.

BY DR. H. V. IHERING.

Upon this matter Mr. Pilsbry has communicated two papers in the NAUTILUS for 1892 (pp. 54-57 and 67-69). A curious confirmation of his observations upon simultaneous discoveries in science is the fact that I published the same ideas as Mr. Pilsbry, at the same time, in a paper finished by me in 1891.¹ In that paper, p. 487, I stated that:

Maoriana Suter is synonymous with *Strobila*;

Phrixgnathus Hutton is synonymous with *Punctum*.

And that these genera, and also the (so-called) *Microphysa*, and the other allied New Zealand genera are *Putulidæ*. Mr. Pilsbry having made the same disposition of them in his paper, p. 55.

Mr. Pilsbry, again, (p. 69) has offered the same opinion upon the systematic value of the mucous pore as I have done on p. 401 of my paper, and has even used the same examples, to which I added *Zonites* with, and *Zonitoides* without mucous pore. I trust that Messrs Hedley and Suter will recognize from the study of my paper, that the ideas of Semper on the *Zonitidæ* are extremely erroneous; and that they will therefore agree with Pilsbry and myself, in discarding Semper's conclusions.

¹ H. v. Ihering Morphologie und Systematik des Genitalapparates von Helix, Leipzig, 1892. Zeitschr. f. wiss. Zoolog. Bd. 54, p. 386-420 and Taf. 18, 19.

I agree completely with Mr. Pilsbry in regarding the numerous "genera" of the *Charopidae* instituted by our Australasian confrères as subgenera of *Patula*. Thus *Patula* is a completely cosmopolitan genus. The true *Helicidae* do not exist in New Zealand. In my paper already cited, I have restricted the family *Helicidae* (p. 426) to the genera having a dart sack or sacks (belogonous). These are the following:

1. *Xerophila* (Held.) v. Ih.
2. *Fruticicola* (Held.) v. Ih.
3. *Helix* (L.) v. Ih.
4. *Campylaea* (Beck) v. Ih.
5. *Gonostoma* Held.
6. *Dorcasia* (Gray) v. Ih.
7. *Cochlostyla* Fér.

The genus *Helix* comprises *Tachea*, *Pomatia*, *Iberus*, *Macularia*. The Helices of U. S. are not belogonous and form my genus *Neohelix* (p. 482), corresponding in general to what Mr. Pilsbry called *Polygyra*. But as Mr. Pilsbry's genus also included *Gonostoma* and *Vallonia*, these genera are not synonymous. It is not at all convenient to give the name *Polygyra* to the section *Polygyra* and also to a greater group which each zoologist defines in a different manner. The genus *Neohelix* is a very natural one, but its systematic position will not be evident until the origin and affinities of the genus are demonstrated, and this, I believe, will be made out by farther anatomical and embryological studies.

I provisionally give the name *Parahelix* (p. 492) to all Helices which are not *Helicidae* or *Neohelix*. The anatomy of the *Parahelix* group is almost unknown.

The family of *Helicidae* is not represented (excepting the imported genera) in the U. S. east of the Rocky Mountains; and there seems no paleontological evidence that they formerly existed there. The genus *Campylaea* extends from Europe and Asia to California, Central America and eastern South America. These South American Helices without doubt are pliocene immigrants. No *Helicidae* are found in Australia, New Zealand or Polynesia. Nor in Chile and La Plata tertiary beds no true *Helicidae* occur. There can be no doubt that the family *Helicidae* is a palaearctic one, which in tertiary time extended to America.

I agree in general with the observations made by Mr. Pilsbry on the relations of the New Zealand fauna; but I believe that Mr.

Pilsbry did not take into consideration the disposition of some cosmopolitan genera in certain points. Thus *Pupa* is represented but by one species in New Zealand, and *Succinea* not at all; and notwithstanding there are perhaps no two genera of Nephropneusta more cosmopolitan than *Pupa* and *Succinea*. The genera *Physa*, *Planorbis*, *Limnæa*, *Ancylus* (with *Latia*), *Cyclas*, *Pisidium*, *Neritina*, *Helicina*, *Melania* are cosmopolitan but have disappeared with time in some localities. Some genera now confined to one locality were once cosmopolitan like *Partula*, now Polynesian only, but found in the European eocene by Oppenheim and in the Florida miocene by Heilprin. Other genera may have been more restricted in distribution as I presume with the *Chilinas* of Archiplata, which shall be discovered I assume some day in mesozoic beds of Australia or New Zealand. It is to be studied which are the genera or families of Nephropneusta which once spread cosmopolitan over the globe. I can name *Partula*, *Succinea*, *Pupa* and perhaps some Zonitidae, *Bulimulus* with *Partula*, *Bulimus* with allied genera.

If we compare the molluscan fauna of South America and New Zealand, it is evident that it is impossible to expect to see the relations as very close. Both have undergone enormous modification since they were disconnected in the beginning of the tertiary period according to the theories of Mr. Hutton and myself. The archiplatan province of South America has in the later tertiary received immigrants from North and Central America (such as *Campylæa*) and from the Archamazonian province (as *Streptaxis*, *Ampullaria*, *Glavaris*, etc.). New Zealand on the other hand, received immigrants from the adjacent islands and from Australia, and this Australian element is perhaps in part Asiatic. The genera common to Archiplata and New Zealand thus may be very few. Anyone who studies land shells from Archiplata, excluding the northern immigrants will be astonished by the extreme poverty of the fauna. And what remain as presumably autochthonous, are such genera as *Pupa*, *Succinea*, *Partula*, *Bulimulus*, *Bulimus*.

I am quite aware that these facts are not sufficient to prove the ancient connection of Archiplata and New Zealand; but it should also be stated that no facts contradictory to such connection have been adduced. The argument can be conclusive only when we know better the paleontological history of the fauna. What is known to-day is in favor of my theory, as I have demonstrated in relation to the fresh-water shells. Also the fossil marine shells will probably

give the same result. Is it not a curious fact, that in the Patagonian eocene occurs a true *Struthiolaria*, a genus not elsewhere encountered either recent or fossil but in New Zealand? All these questions can only progress when the relations of the fossil faunas of Australia and New Zealand are compared with those of South America.

ON THE ORIGIN OF THE LAND-SNAIL FAUNA OF QUEENSLAND,
AUSTRALIA.¹

BY CHARLES HEDLEY.

In a former article I dealt with the internal distribution of the mollusca of British New Guinea. A few remarks on the external relations of this fauna have since suggested themselves. Wallace's line, so conspicuous a severance among the vertebrates, appears to be quite blotted out when the distribution of animals is regarded from a molluscan standpoint. No sharp break occurs between the Malayan fauna as exemplified in Borneo or the Philippines and in New Guinea. All the characteristic Malayan forms, *Atopos*, *Xesta*, *Helicarium*, *Microcystina*, *Trochomorpha*, *Obba*, *Chloritis*, *Cochlostyla*, *Pupina* and *Diplommatina*, are common to both regions. The Solomon Islands, Fiji, Samoa, etc., appear by the light of the Papuan shells to be inhabited by an eastern extension of this Malayan fauna, which has also overflowed into Queensland.

One of the most remarkable facts yielded by an analysis of the Australian land molluscan fauna is that the operculate snails are confined to a narrow strip of land along the Queensland coast. Proceeding southward from Torres Straits, they diminish gradually till the last outpost of the invading army is reached about the Clarence River. The sole apparent exception to this rule is *Truncatella*, which spreads to Tasmania and South Australia; but as this genus is strictly littoral and evidently migrates not by land but by sea, it cannot be considered as a disturbing factor in my generalization. Contrasting the fauna of Queensland with the more typically Australian and probably archaic fauna of Tasmania, Victoria and Western Australia on the one side, and that of New Guinea on the other, it will be seen that this foreign aspect of the operculate genera *Pupina*, *Helicina* and *Diplommatina* is shared by the inoperculate

¹ From an article in Proc. Lin. Soc. N. S. Wales, Australia.

forms of *Atopos*, *Hadra*, *Chloritis* and *Papuina*; *Atopos prismaticus* of Papua claiming affinity with *A. australis* of Queensland; *Hadra broadbenti* with *H. fraseri*; *Chloritis chloritoides* with *C. porteri*; and *Papuina naso* with *P. macgillivrayi*. The species actually common to both regions are few; *B. macleayi* inhabits both countries, *T. annula* only finds a place in the Queensland catalogue by courtesy, while *Pupa pedicula*, *S. gracilis*, *T. ceylonica*, *T. valida*, and *Leptopoma vitreum* are widespread throughout Polynesia. From these premises it may be deduced that the Queensland mollusk fauna, though isolated sufficiently long to have lost specific identity with that of Papua, has nevertheless been derived from it.

The shallow sea of Torres Straits now severs this continent from the adjoining island. Were its bed raised but seven fathoms, the two countries would be united, while an elevation of ten fathoms would form a wide bridge between them. When the marine life east and west of Torres Straits is better known, it will be of interest to observe whether the influence of an ancient isthmus is still visible in any divergence between the fauna inhabiting the two areas.

Further to the westward, the coasts of Australia and New Guinea again converge, being separated by an arm of the Arafura Sea, which gradually shoals from a central depth of 40 fathoms and stretches for about 150 miles between Cape Wessel in the northern territory and Cape Valsche on the opposite shore of Dutch New Guinea.

In the Transactions of the Royal Society of S. Australia, Vol. v., pp. 47-56, Professor Tate enumerates the land and fresh-water mollusca of tropical S. Australia [North-central Australia] it is remarkable that whereas a third of the landshells of Papua and a sixth of the landshells of Queensland are operculate, his census includes no operculate landshells whatever. Thus at the remote date when the ancestors of the present Queensland mollusk fauna migrated from New Guinea across the ancient isthmus that I suppose to have bridged Torres Straits, the Arafura Sea appears to have still presented an impassible barrier between the two countries. The former elevation of land in this region, if uniform from east to west, may therefore be calculated at more than seven and less than forty fathoms.

HELICES COLONIZED IN HERKIMER CO., N. Y.

BY WILLIAM B. MARSHALL.

Mr. Albert Bailey recently sent me specimens of *Helix elevata*, *Helix Mitchelliana*, *Helix profunda* and *Helix exoleta* from localities in Herkimer Co., N. Y. The following notes bearing upon the occurrence of these species in Herkimer county are extracted from a letter received from Mr. Bailey:—

“I think it will be necessary for me to explain the presence of certain Helices in Herkimer Co., N. Y. Several years ago (about 20) Dr. James Lewis, of Mohawk, colonized several species from Ohio in a branch of the ravine leading from Ilion to Cedarville. The specimens sent you are the offspring of the imported species. Of *Mesodon exoleta* Binn., I have collected many specimens—in fact they have become numerous. *Mesodon Mitchelliana* is also quite plentiful. Of *Mesodon elevata* I have found only nine specimens. Of *Mesodon profunda* I have six perfect specimens and some immature. Of *Mesodon multilineata* I have not succeeded in finding any. I have had the good fortune to find one reversed or left handed *Mesodon exoleta*.”

NOTES ON UNIO CORUSCUS GOULD.

BY BERLIN H. WRIGHT.

In the Proc. of the National Museum, Vol. xv., page 419, Mr. Chas. T. Simpson, of the Smithsonian Institution, makes some notes on this species and others which he considers identical with it. He classes my beautifully rayed chestnut *U. fryanus* with the rayless, pitchy-black species, which Dr. Gould described in Proc. Bost. Soc. Nat. Hist., 1856, p. 15, as *U. coruscus*. The description says “*epidermide piceo*,” or tar-like, “*solida*,” or solid, “*transverse ovata ad dorsum lata*,” or transversely ovate and broad behind. The habitat is given as the “St. John’s River, near Beresford, Florida.” The author remarks that it might be taken for a young *U. buckleyi* Lea, but is more *solid*, less angular and *darker colored*, *stronger hinge*.

I have tried hard to find out just what shell Dr. Gould described, have compared shells with the original type and have collected over every foot of ground in the vicinity of Lake Beresford, where the types were found. The original is a *wedge-shaped*, pitchy-black, rayless and *very* solid shell and in but one particular, resembles my *handsomely rayed, oval, thinnish* shell, with a *light* chestnut epidermis. The single point of resemblance is the *naere*, which in both is brilliantly copper colored and iridescent. The type shell at Albany is truncated anteriorly, and *very* abruptly so, according to my figures which are most faithful representations of the different views of Dr. Gould's type specimen, and the dorsal margin is much more strongly arched than in any of my *U. fryanus*. I will add that my shell was not described from a small representation, but I have fully a half bushel as near alike as two pins; and I will add further that no man can find my shell in Lake Beresford or in that vicinity. Neither can it be said that they have become extinct there as no vestige of them occurs on Hontoon Island, at the entrance to Lake Beresford, where there is a perpendicular cut or embankment, fully fifteen feet high, through a mass of Unios.

True it is that *U. fryanus* can be connected by intermediate forms with *U. coruscus* Gd. So also I can just as perfectly connect Mr. Simpson's *U. subluridus*, which he has just described from Florida, with any one of a half dozen Florida species.

SLUGS INJURING COFFEE.

BY T. D. A. COCKERELL.

Mr. Walter W. Wynne, of Brokenhurst, Mandeville, Jamaica, sends me some slugs which injure his coffee trees, together with the following interesting notes: "I first noticed this pest in 1888; it was brought to my notice by seeing numbers of brown leaves on the trees, all at the ends of the primaries. I was very much afraid the leaf disease had come here; however, on examination I found the new growth was, in every case, barked, and after some search found it was done by the slug. Since the discovery I have hardly left off my 'picking gang,' which turns over the rocks and stones, dead tree-trunks, etc., where the beasts lurk in daytime; I have also put heaps of lime at the tree roots, which helps to keep them away

and at the same time does the trees good. On the whole, though, I think the best plan is to plant bananas or plantains, which I am doing, as they are the especially favorite food of the slug, and by carefully searching the bananas, etc., great numbers can be found. The people remember a plague of these slugs some twenty years ago."

Mr. Wynne has gone into the question of remedies so carefully that there is little to add from the practical standpoint. It would probably be a good plan to encircle the trees, near the ground, with a thick ring of some obnoxious substance, such as coal tar or cart-grease. This could be done quite cheaply, and the slugs would be prevented from ascending the trees.

These slugs belong to a species called *Veronicella sloanii*. They were first noticed by Sir Hans Sloane, and afterward named *sloanii* by Cuvier. I have seen a specimen, collected by Sloane, preserved in the British Museum. The typical form is white or whitish, but Mr. Wynne's specimens constitute a variety, which may be called *Veronicella sloanii* var. *coffea*. This variety is over three inches long when adult, and about an inch and a quarter broad. Above it is dark brown, obscurely mottled with darker, but beneath white, more or less tinged with yellow. The foot or sole on which it walks is very much narrower than the body.

Institute of Jamaica, Jan. 26th, 1893.

NOTES ON THE HELICES OF THE BIOLOGIA CENTRALI AMERICANA.

BY H. A. PILSBRY.

[Continued from p. 117.]

The new section, *Praticolella*, is proposed by von Martens to replace *Praticola* Str. & Pffr., preoccupied. *H. griseola* and *H. berlandieriana* are united and both are well figured. The use of the subgeneric name *Lysinoë* for the *Aglaia* and *Odontura* of previous authors, is a needed reform and was adopted some years ago by the writer. The Mexican species of *Arionta*, described a year ago by R. E. C. Stearns, is not included.

In his rehabilitation of the subgenus *OXYCHONA*, Dr. v. Martens neglects to state that he follows the arrangement originated by the writer three years ago, and discussed at length in the *Manual of Conchology* (2), V, p. 128.

Oddly enough, v. Martens says that "perhaps also the Brazilian *H. bifasciata* and *H. lonchostoma* may find their natural place in this subgenus." The "perhaps" might well have been omitted in view of the fact that *H. bifasciata* is the type of the group! The curious *H. sigmoides* of Morelet is placed with doubt in SOLAROPSIS.

The genus POLYGYRA is adopted in the sense in which it is understood by myself and later American writers. Two new species of *Polygyra* are described and figured.

Of the genus STOBILA an interesting form, *S. salcini* Tristr., is described and figured. It is from N. Guatemala and resembles our *S. labyrinthica*, but the umbilicus is much wider.

The part concludes with the genus LABYRINTHUS. This group will prove to be a subgenus or section only of the genus *Caracolus*, as defined by me in 1889. The anatomical characters of *Caracolus* and its sections, *Lucerna*, *Dentellaria*, etc., have been discussed in the Proc. Acad. N. S. Phila., during the past year.

NOTES UPON DR. v. IHERING'S OBSERVATIONS.

BY H. A. PILSBRY.

The paper upon New Zealand Helices by our distinguished South American correspondent calls to mind a few thoughts which may be of interest to those who have read the previous articles.

It may be stated here, although the matter of no consequence, that my two articles upon this subject were published respectively two and one month prior to the issue of the *zweiter Theil* of v. Ihering's paper¹ (the portion containing his remarks upon New Zealand forms), although there is no doubt that the latter was written before mine, in fact during 1891. Our essential agreement upon certain points is a great satisfaction to me because it is a strong recommendation of the truth of those views. Especially is this the case in the estimation made by each of us of the systematic value of the mucous pore in *Zonitidæ*, and in the reliance upon characters of the generative system for the foundation of generic groups of Pulmonates. In regard to the mucous pore the writer wrote emphatically some years ago, that it could not be a family character, and in some cases is not even generic. Should we make a new "family"

¹Zeitschr. f. Wiss. Zool., 54, drittes Heft. Ausgegeben den 4, October, 1892. Received at Philadelphia, Oct. 25, 1892.

for *Pæcilozonites*, which has the dentition, radula, etc., of *Zonites*, but no mucous pore? Or for *Streptostyla ligulata* because it has a tail-pore while some of the other *Streptostylas* with very similar shell and anatomy have none?

Passing over Dr. v. Ihering's limitation of the family *Helicidae*, which I can readily prove to be untenable, I may be excused for making some mention of the new genus *Neohelix*. Several years ago, when I recognized the essential identity of *Polygyra*, *Triodopsis*, *Mesodon*, etc., I selected the first of these as a generic name for the whole, because it was the *oldest* name proposed. In common with the vast majority of modern naturalists, I recognize the *rule of PRIORITY* as absolute. Were it otherwise I could change Dr. v. Ihering's *Neohelix* to "*Paleohelix*" on the ground that he includes *H. townsendiana* Lea in it, that species being really a *Lysinoe*!¹ Or on the ground that *Neohelix* is a misnomer, for they are not "new" helices at all, but a much older, more archaic type than the genuine *Helix* of Europe! The latter, indeed, are the *new* *Helix*, being the most highly specialized of all *Helices*.

As to v. Ihering's group "*Parahelix*," formed to include "all *Helices* not *Helicidae* or *Neohelix*," it seems to me to be an entirely unnecessary addition to nomenclature; for it would include forms in no way related to one another. The anatomy may be unknown to Dr. v. Ihering, but, as may be seen by glancing over my paper on the genera of *Helices*, it is not unknown to some others. It is as if one were to propose a "family" to include *all carnivora* not belonging to *Felidae* or *Canidae*.

In respect to the former wide range of *Partula*, it should be said that Oppenheim's "*Partula*" are *Buliminus*, and Heilprin's are *Bulimulus*; both groups exist in the same regions to-day. A word on the former connection of New Zealand and South America. The only elements the two faunas have in common seem to be either (1) cosmopolitan genera, all of which probably date back to the Carboniferous period, or (2) genera of like ancient origin, but which have been replaced in the Tropics and the North by the more modern types developed by the more active competition. At the same time, I offer this simply as an *opinion*, which may stand or fall. In any case, the hypothesis of Prof. Hutton and Dr. von Ihering is of great interest, and cannot fail to stimulate investigation of this most important question.

¹ v. Ihering probably meant *H. ptychophora* Brown, a *Mesodon* formerly confused with the other species.

G. W. LICHTENTHALER.

To-day the news has reached me from California, of the death in San Francisco, February 20th, of GEORGE W. LICHTENTHALER, late of Bloomington, Ill. He was an enthusiastic conchologist, and his name is well known among lovers of shells, throughout the country. Deeply interested from the start in the success of the American Association of Conchologists, he contributed largely to its special American collection. Many of the labels in that collection, especially of West Coast shells, bear his name. But not alone in public was his generosity shown. Many of our younger conchologists can testify to the practical help received from him in the early stages of their study. He was a quiet, unassuming man, and it is fitting that we should express in words the sense of loss which we all feel.

I first met him in 1878 on the Pacific Coast, where he spent the winter for many years accompanied by his wife, travelling from San Diego to Puget Sound, in search of the forms of marine life which were their special objects of study. His wife died not many years after the period of which I speak, deeply mourned, and since then he has travelled alone. I last saw him in Oakland about a year ago.—*Wm. J. Raymond.*

NOTES AND NOTICES.

ANNOUNCEMENT.—Conrad's "Fossil Shells of the Tertiary Formations of North America" will be republished as soon as 100 subscriptions can be obtained at \$3.00 each. The republication will consist of No's 1, 2, 3 and 4, of the original edition, 1832-33, and the so-called reprint of No. 3, 1835. The various changes made in the text of each of these parts in different editions will be given in full. Those desiring copies of this work should confer at once with Mr. G. D. Harris, Smithsonian Institution, Washington, D. C.

The Wagner Free Institute of Science will doubtless republish Conrad's "Medial Tertiary" under somewhat similar conditions.

HELIX NEMORALIS IN WISCONSIN.—While in Baraboo, Sauk Co., Wis., last fall, a little boy gave me a handful of *Helix* shells, that he said he picked up in the summer, while his father was plowing. They were all dead excepting one, which seemed to be of a different species and new to me. Through the kindness of Mr. Bryant Walker, I found the shell to be of the European species, *Helix nemoralis* Müller. It was so late in the fall I could not go out and

look for more specimens, but hope to be able to do so in the spring. If I succeed in finding more will report it, believing that some of the readers of the NAUTILUS would be interested in the find, from this locality.—*Nettie A. Rowley, Evansville, Wis.*

CANTHARIDUS IRIS Martyn.—It is not generally known, we believe, that the young of this handsome New Zealand shell is umbilicated: but a specimen 18 mill. in length in the collection of Mr. Shelley G. Crump shows this to be the case. The umbilicus is narrow and like that of an *Eutrochus*. The shell is evidently quite normal, and would serve quite well for a "new species" of *Eutrochus*, the periphery being sharper than in adult *C. iris*. Under a lens the surface of this specimen, as well as of some others in the Philadelphia Academy collection, is seen to be finely *pitted*, as if eroded by an *Eschara*. We say *as if*, for no trace of foreign growth is visible on the shell. It would be interesting to know the cause of this sculpturing.—*H. A. P. & C. W. J.*

DR. WM. H. DALL's second volume upon the tertiary mollusca of Florida, etc. has appeared. A full notice of the numerous important additions to our knowledge of this fauna contained therein will be given next month.

An interesting paper read by Mr. Joseph Willcox before the Delaware County Institute of Science, entitled "ON THE EVOLUTION OF THE EARTH AND THE HEAVENLY BODIES," has been published in pamphlet form. The course of cosmic and terrestrial evolution is graphically described in the light of the latest researches; it would be difficult to find elsewhere the same amount of reliable information presented in such compact and readable form.

EXCHANGES.

WANTED.—Fossils, especially *Trilobites*, also *Murex* and *Zonites*, any locality, and shells not in my collection. Offered—British Land and Fresh Water and U. S. Land and Fresh Water shells.—*Robert Walton, Houghton St., Roxborough, Phila., Pa.*

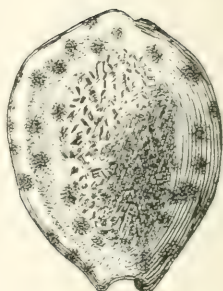
MARINE, Land and Fresh Water shells, fossils, minerals, to exchange for marine shells or reliable works on marine mollusca.—*Homer Squyer, Mingusville, Montana.*

WANTED.—*Unios* and other fresh water and land shells, in exchange for those of southern Wisconsin. Please send list and receive mine.—*Nettie A. Rowley, Evansville, Wis.*

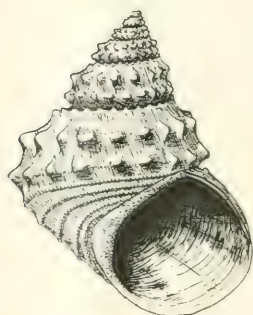




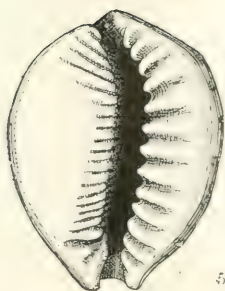
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THE NAUTILUS.

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No. 12

ILLUSTRATIONS OF NEW SPECIES OF SHELLS.

NOTE.—In the December, January and February numbers, plate II is referred to erroneously as pl. I. All the figures of this plate are slightly magnified, being one and one-third times natural size.

Nanina (Ariophanta) Dohertyi Aldrich. Pl. II, figs. 1, 2.

This species was described in the December no., p. 90.

Bathybembyx Crumpii Pilsbry. Pl. II, fig. 3.

This species was described in the January no., p. 105, as *Calliostoma Crumpii*. In the last number of the "Journal de Conchyliologie" (Paris), Mr. Crosse proposes the name *Bathybembyx* to replace Watson's genus *Bembyx* (preoccupied). In it he places *B. æola* Watson, *B. argenteonites* Lischke, and also, with doubt, *B. alwineæ* Lischke. The last species should, I believe, be left in *Calliostoma*. The others form a natural group of very beautiful shells, characteristic of the Japanese fauna. These shells are closely allied to *Solariella*, but larger and imperforate. They seem very nearly related to Dall's subgenus *Turcicula*, differing only in the very thin (or lacking) epidermis. The species here figured is perhaps the most beautiful of the three now referred to *Bathybembyx*.

Cypræa cruenta var. **Greegori** Ford. Pl. II, figs. 4, 5.

Described on p. 112, February, 1893.

A NEW ANODONTA.

BY CHAS. T. SIMPSON.

Anodonta mearnsiana.

Shell rhomboid, compressed anteriorly, inflated posteriorly, generally smooth and shining, covered with rather sulcate growth lines, moderately solid in structure, having a thin epidermis, which is easily worn off, and varying from yellowish to olive-green in color; beaks sculptured with some half dozen undulations, which are acute posteriorly, and rounded anteriorly. The female shell exhibits a considerable degree of inflation extending from some distance back of the beaks to the posterior-ventral region, and with the male shell occasionally shows a couple of slight sulcations running from the umbones along the dorsal slope.

The upper part of the anterior curve is rather more prominent than the lower; the ventral region is sometimes slightly emarginate in the center of the females; and there are occasional slight traces of biangulation posteriorly in the shells of both sexes. Nacre a soft silvery color, inclining to a lurid brownish in the quite shallow cavity of the beaks; and near the rather straight hinge line; the brown patch or scar at the end of the nearly concealed ligament rather elongated; cicatrices rather distinct.

Mantle large, thin, not heavily bordered, brownish in the region of the fringes and anal opening, whitish elsewhere; fringes few, fleshy, and rather pointed. Branchiæ moderate, the inner slightly larger, and darker than the outer; branchial opening large, furnished with a few rather short, fleshy papillæ. Palpi elongated, pointed at the posterior, united for three-fourths of their length. Foot solid, rugose. Anal opening large, not furnished with papillæ; super-anal opening small, removed to some distance above the anal opening.

Length from anterior to posterior ends 85, breadth 45 mm.; diameter 25 mm. San Bernardino Ranch, Mexican Boundary Line, Arizona.

A large number of shells and a few specimens preserved in alcohol were sent some time ago to the U. S. National Museum by Messrs Mearns and Holzner of the International Boundary Commission. Externally the shell closely resembles certain forms of *Unio complanatus*, but it is in general a smoother species, and has a more delicate texture. Much as it differs from the ordinary *Anodonta*

angulata I believe that species to be its nearest ally; the two forming a group peculiar to the Pacific drainage of the United States, and quite distinct from *Anodonta wahlametensis*, *californiensis*, *nuttalli*, *oregonensis*, *kennerlyi*, and *youkonensis*, which undoubtedly group with *Anodonta cygnea*, and which may have descended from that protean species, and reached North America by way of a former land passage in the neighborhood of Bering Strait. A dorsal view reveals a striking resemblance between the present species and *Anodonta angulata*; both have the area of greatest inflation about one-third the length of the shell from the posterior point, from which they gradually narrow to near the anterior end, where they become more rapidly compressed to the point, the beak sculpture is similar; the general outline of the shells is much alike, and there is quite a strong resemblance in the texture and the nacre. *Anodonta angulata* in the Museum collection (Mus. no. 104,165) from Northern California, shows a remarkable fading out of the peculiar keel common to that species, and another specimen (no. 104,166) from Los Angeles shows still less of this character, and in a photograph taken by Mr. Hemphill from a specimen in his collection it is wanting altogether, while the two sulcations on the posterior slope show quite plainly.

At the same time, the species under consideration differs sufficiently from *Anodonta angulata* in texture, and the form of the inflation of the posterior region in the female to separate it at once specifically from that form.¹ This new species will be figured when the large amount of land and fresh-water material from the western United States collected by the Biological Survey of the Agricultural Department is worked out, and the results published.

THE SHELL-BEARING MOLLUSCA OF MICHIGAN.

BY BRYANT WALKER, DETROIT, MICH.²

Aplexa sp. A small species about the size of Lea's *Physa hor-dacea* and apparently related to it, was found in a small lake lying between Torch Lake and Grand Traverse Bay in Antrim County.

¹ So far as I know no description of the soft parts of *Anodonta angulata* has ever been published.

² The following portion of Mr. Walker's paper should have appeared in the August NAUTILUS.

It is quite different from any other species found in the State, but in present chaotic condition of the synonymy of this genus it does not seem advisable to run any risk of duplicating some previous description.

Planorbis lentus Say. Cited by Miles, who probably had a large form of *trivolis* before him.

P. trivolis Say. Abundant everywhere. *P. corpulentus* Say and *regularis* Lea usually referred to this species are cited as distinct by DeCamp. The latter is doubtfully cited by Currier.

Specimens exhibiting the distorted appearance caused by a change of plane in the growth of the whorls as described by Ingersoll in his *P. plexata* occur not infrequently in some localities.

P. truncatus Miles. This peculiar and well marked form appears to be confined to Michigan. Described originally from specimens collected from Saginaw Bay, it seems to have escaped further notice until 1887, when it was discovered in the Elk river, Antrim County. These specimens are quite typical and not only confirm the validity of the species, but extend its range across the entire northern part of the State.

P. bicarinatus Say. Common everywhere.

P. bicarinatus corrugatus Currier. Perch Lake, Kent County. A well marked form characterized by its costate surface. Specimens from Long Lake, Grand Traverse County, exhibit the same tendency but not to the extent shown by the shells from the original locality.

P. bicarinatus major. Specimens from Crystal Lake, Benzie County, from their perfection and size are worthy of being separately noticed. They are larger, pinkish-white in color, with the carinae on both surfaces elevated into a keel which is white. The superior carina extends to the lip and modifies the shape of the aperture, which is a more or less expanded and darker in color within. The outer lip is somewhat thickened and white.

P. multivolis Case. The rediscovery of this long lost species by Dr. M. L. Leach, in Marl Lake, Roscommon County, has been recorded in the Journal of Conchology, V, p. 330. The hump on the last whorl opposite the aperture as figured in Land and Fresh-Water Shells pt. II, fig. 186, is not a characteristic of the normal shell, as but a small percentage of several hundred specimens exhibit any tendency toward it. When it does occur, it bears the appearance of being an abnormal extension of the last whorl being

more or less irregular in form, and usually deflected from the plane of the rest of the whorls.

P. campanulatus Say. Common everywhere. An occasional specimen has a hump on the last whorl opposite the aperture as described by Case in *P. multivolvis*.

P. campanulatus minor Currier. Distinguished only by its smaller size. Perch Lake, Kent County.

P. albus Mull. Commonly distributed over the State.

P. excavatus Say. This species which is found in all parts of the State, varies considerably in size and color.

P. deflectus Say. While not a common species, it undoubtedly ranges over the whole State.

P. parvus Say. Common everywhere and varies considerably under local influences.

P. costatus DeTar and Beecher. A minute costate form said to be from the neighborhood of Ann Arbor. I know nothing of it.

Segmentina armigera Say. Common everywhere.

S. wheatleyi Lea. (?) Found in great abundance several years in the suburbs of Detroit. Has not been noticed elsewhere in the State. This form if not Lea's *Wheatleyi* is easily separated from the typical *S. armigera* by its thickened lip, which decidedly contracts the aperture.

Ancylus fuscus Ad. Although cited in all the catalogues from that of Miles down, this species does not seem very common. Belle Isle, in the Detroit river is the only locality where I have found it.

A. rivularis Say. Cited by DeCamp.

A. parallelus Hald. Northern part of the State.

A. diaphanus Hald. River Rouge, Wayne County. Also cited by DeCamp.

A. tardus Say. The most common species we have, judging from my own experience.

Valvata tricarinata Say. Common everywhere. The forms *bicarinata* Lea, *unicarinata* DeKay and *simplex* Gld. are cited as distinct by DeCamp.

V. sincera Say. Very abundant in favorable localities all over the state. The form known as *striata* Lewis, or *Lewisi* Currier, distinguished by its coarser striae and larger size, is cited as distinct by

Currier and DeCamp; the latter, however, now considers it a strongly marked form of *V. sincera*. *V. humeralis* as cited by Miles, is undoubtedly a form of this species.

Lyogyrus pupoidea Gld. Cited by DeCamp.

Vivipara contectoides W. G. Binney. The only reference to the occurrence of this species in Michigan, that I know of, is that made by Binney (Land and Fresh-Water shells II, p. 24). It does not appear to have been found by any of our local collectors and must be considered a very doubtful member of our fauna.

Campeloma ponderosa Say. Cited by Sager, Miles and Currier, but does not appear in any of the later lists and must be considered a doubtful species in Michigan. "I have never seen it from this state as I found it in Alabama. It is not a northern species." W. H. DeCamp.

C. decisa Say. Common and variable. Sinistral specimens are cited by DeCamp as var. *heterostropha* DeKay.

C. decisa flava Currier Mss. Specimens from Long Lake, Grand Traverse County are so named by Mr. Pilsbry. A very beautiful form of this common species.

C. decisa melanostoma Currier Mss. A small form from Grattan, Michigan, was sent to me under this name by Mr. Streng.

C. integra Say. Common everywhere.

C. rufa Hald. Generally distributed over the State, but not as common as *C. integra* and *decisa*.

C. gibba Currier. I know nothing of this form beyond the description by Currier and Dr. Jas. Lewis' critical remarks thereon in the American Journal of Conchology (III, p. 112 and IV, p. 81.)

C. Milesii Lea. Originally described from Antrim County. The reference of specimens from the Detroit river to this form has been approved by Mr. Pilsbry.

C. obesa Lewis. Quite common throughout the State and frequently of large size.

C. subsolida Anth. Cited by DeCamp. Specimens from the Boardman river, Grand Traverse County, identified as this specimen by Prof. R. E. Call are referred to *decisa* by Tryon and Pilsbry.

Lioplax subcarinata Say. Dr. Leach informs me that a single specimen from Higgins Lake, Roscommon County, was referred to this species by Mr. Tryon.

Bythinia tentaculata L. The recent discovery of this species at Holland, Michigan, by Dr. DeCamp was noticed in the NAUTILUS for October, 1891. I am indebted to him for specimens.

Somatogyrrus isogonus Say. Cited by Miles and Currier. Stimpson's anatomical studies of this species for his "Researches upon the Hydrobiinæ" were made from Michigan specimens. (Loc. cit., p. 22). DeCamp cited it in his catalogue on Currier's authority but writes: "I do not believe that it exists in this State. Have for many years examined the ground where Currier said he found the specimens sent Stimpson, but have never found anything but young of *Campeloma decisa*."

Amnicola porata Say. Common all over the State. *A. pallida* Hald. and *limosa* Say, which are cited in different lists as distinct, are now I believe generally considered forms of this species.

A. cincinnatiensis Anth. Not as common as the preceding specimens, but ranges over the whole State.

A. decisa Hald. Cited by DeCamp.

A. grana Say. Common in the southern part of the State.

A. lustrica Pils. Common and somewhat variable. The late Dr. James Lewis, many years ago, characterized specimens from the Huron river at Ann Arbor as "largest I have ever seen."

Bythinella attenuata Hald. Cited by DeCamp, to whom I am indebted for specimens from Grand Rapids.

B. tenuipes Coup. Cited by DeCamp, who writes me: "I sent living specimens to Tryon and he sanctions their identity."

B. Binneyi Tryon. Cited by DeCamp.

B. Nicklinana Lea. Cited by DeCamp.

B. obtusa Lea. River Rouge, Wayne County. Also cited by DeCamp from Kent County.

Pomatiopsis lapidaria Say. Common in the southern part of the State.

P. cincinnatiensis Lea. Cited by Beecher in the list of Ann Arbor shells. I have received specimens from Petersburg, Monroe County collected by Mr. Jerome Trombly.

Pleuroccra subulare Lea. Southern part of the State. Common.

P. subulare intensum Anth. Collected by Dr. Leach in Mono Lake, Muskegon. Cited also by DeCamp.

P. neglectum Anth. Cited by Miles and DeCamp. Mr. Streng has kindly sent me specimens from Grand River, Kent County.

P. elevatum Say. Grand River, Michigan, received from Mr. Streng.

P. labiatum Lea. Cited by DeCamp.

B. pallidum Lea. Cited by DeCamp.

Goniobasis livescens Mke. Very common and considerably subject to local variation.

G. livescens cuspidatus Anth. This form occurs abundantly in the Maple River, Clinton County, where it was collected by Dr. Leach. Cited by DeCamp from Kent County, and collected by Streng at Berlin, Ottawa County.

Goniobasis Milesii Lea. Huron River, Ann Arbor, Michigan. This form originally described from Tuscola County specimens, is probably a local variety of the preceding species.

G. translucens Anth. Grand River, Kent County, collected by DeCamp. It is doubtful whether this species is more than a banded variety of *G. livescens* Mke.

G. brevispira Anth. Collected at Mono Lake, Muskegon by Dr. DeCamp and identified by Pilsbry.

G. pulchella Anth. Cited by Miles and DeCamp.

G. gracilior Anth. Cited by DeCamp from Round Lake, Petosky, Michigan.

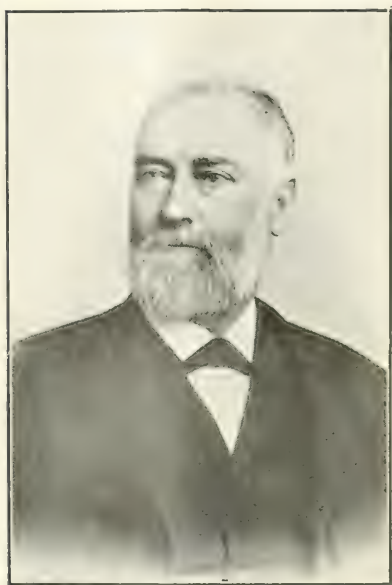
G. Niagarensis Lea. Cited by Miles.

G. Virginica Gml. Cited by Sager and Miles. Clearly an error as the species does not occur west of the Alleghanies. As *P. subulare* is not given in either of these lists, it seems probable that that is the species referred to.

Unio alatus Say. Southern part of the State. Muskegon is the most northern locality known to me. Specimens from the Detroit river are but half the size of those from the Rouge river, one of its tributaries in Wayne County. The same dwarfing effect of the colder water of the Detroit river is noticeable in nearly all of the species found there.

ADDENDA.

On page 66, line 14, for *S. partumeium* Prime, substitute *S. Jayanum* Prime, and add the following:



GEORGE W. LICHTENTHALER.

S. partumeium Say. Very abundant everywhere and quite variable.

GEORGE W. LICHTENTHALER.

BY MORTON J. ELROD, ILLINOIS WESLEYAN UNIVERSITY.

The familiar face of George W. Lichtenthaler, one of the best known of American conchologists, and one of the most earnest and energetic collectors of natural history specimens, will be seen no more. He passed away at San Francisco on Tuesday, February 20th., death being caused by fatty degeneration of the heart. He was 60 years of age.

Mr. Lichtenthaler was born in Pennsylvania, and came to Bloomington, Ill., at the age of twenty-two. For five years he was a drug clerk, then bought out the stock, conducted business for himself for seventeen years, after which he retired with a snug fortune. During this time he imbibed a taste for natural history, and after his retirement devoted his entire time and the proceeds of his large estate to the gathering and collecting of shells, ferns, and algae. Mrs. Lichtenthaler died nine years ago, leaving no children. After her death Mr. Lichtenthaler turned his mind more than ever to his chosen work. His wife's death was a great blow to him, and he was no doubt greatly moved to collecting to forget his sorrow. His affection for her is shown in his desire that the vast collection should be given a name that would incorporate the name of "Rebecca S. Lichtenthaler."

Mr. Lichtenthaler was an amateur collector, never having sold specimens, or labored for hire. It was a labor of love. If he could not exchange he would give of his duplicates to those who would make use of them. Many people of this community treasure collections from distant climes given by him, and many a lad with a love for nature has had this love fanned into a flame through his encouragement, and has gone from the presence of this great-hearted man not only with a greater love for nature's works, but with a liberal gift of shells or other specimens carefully preserved. Many a case has he recounted to me, sitting by my fireside, of boys he has helped to knowledge and position, by pointing the way and lending substantial aid.

Had he desired, he might have been famous as a traveler, by putting his observations in print. But he disliked and shunned publicity, and we know of nothing he has written. He was one of those workers who cared little for making new genera or species, and who collected not wholly for himself, but also for his fellow workers, and for public museums. In his travels he has been in nearly every country in the world, has been several times along the entire west American coast, was at home in the Sandwich Islands, has traversed the coast of Europe from North Cape to Gibraltar, and has been up and down both coasts of Africa, as well as around the Indian Ocean. In these travels many of the rarest species known to science were brought together, and are left among his great collection.

He was one of the early members of the "American Association of Conchologists," being enrolled as a member, May 15th, 1890. His special study was shells of the Pacific Coast. He was an active and enthusiastic member, and did much toward its promotion. His gift of Pacific Coast shells to the collection of the Association was a large and valuable addition.

Few men have as wide a personal acquaintance with men of science as he had. Devoting all his energy and time to travel and collecting, and having been all over the American continent, he met them everywhere. His retiring disposition led him to make little mention of his achievements and his great work was not known to many of the people of his home. But to a few of his friends and acquaintance who could appreciate his work he unburdened his heart, and would recount his travels and experiences, and give descriptions of museums and countries for hours at a time. He was an interesting conversationalist, and would relate his experiences in a manner that always commanded attention.

His main work was in conchology. His collection embraces many highly polished specimens, and he spared no expense to have always the finest and best that was to be had. While on a trip to France a few years ago he heard of an English firm who cut gastropods longitudinally to show their spiral arrangement, and he has case after case of shells of this exquisite workmanship. All his specimens are authoritatively correct, having been labelled by the highest authorities, and we are glad to announce to the conchologists of the middle and western United States that he has left the collection where it will be accessible to the public for comparisons.

His collection embraces shells, crustaceans, echinoderms, corallines, corals, fossil shells and plants, minerals, ferns, and marine algae. There are six to eight thousand species of shells, and at a low estimate twenty-five thousand specimens, from all parts of the world. There are eight hundred species of marine algae, and four hundred species of ferns. The latter include a nearly complete collection of the ferns of North America, a complete collection from the Hawaiian Islands; also many from India, China, Japan, Australia, New Zealand, South America, Europe, etc. He stated that he had two species not in any other collection.

This vast and valuable collection he leaves without reserve to the Illinois Wesleyan University, in Bloomington, where his life has been spent, where his bride was wedded and laid to rest; and here his many friends will be permitted to again look through it, but without his guiding hand and eloquent description. This gives the Illinois Wesleyan University his life work, and endows it with one of the finest conchological collections in the West. It will be known as the "George W. and Rebecca S. Lichtenthaler Collection," and will enshrine their names not only in the hearts of their friends, but also in the hearts of many students who will receive inspiration from his work, as many have done from his life.

NOTES AND NOTICES.

CORRECTION.—In the February No. the date of Mr. Martindale's death was by error given as Jan. 10, instead of Tuesday Jan. 3d.—*P. N.*

PROF. B. SHIMEK, of the State University of Iowa, is collecting invertebrates and cryptogamous plants in the interests of that institution in Nicaragua.

CONRAD'S MEDIAL TERTIARY.—The Wagner Free Institute of Science of Philadelphia, Pa. proposes to reprint the book on The Medial Tertiary Fossils of the United States by T. A. Conrad, if 150 subscriptions can be obtained at \$3.50. For circular apply to the Institute.

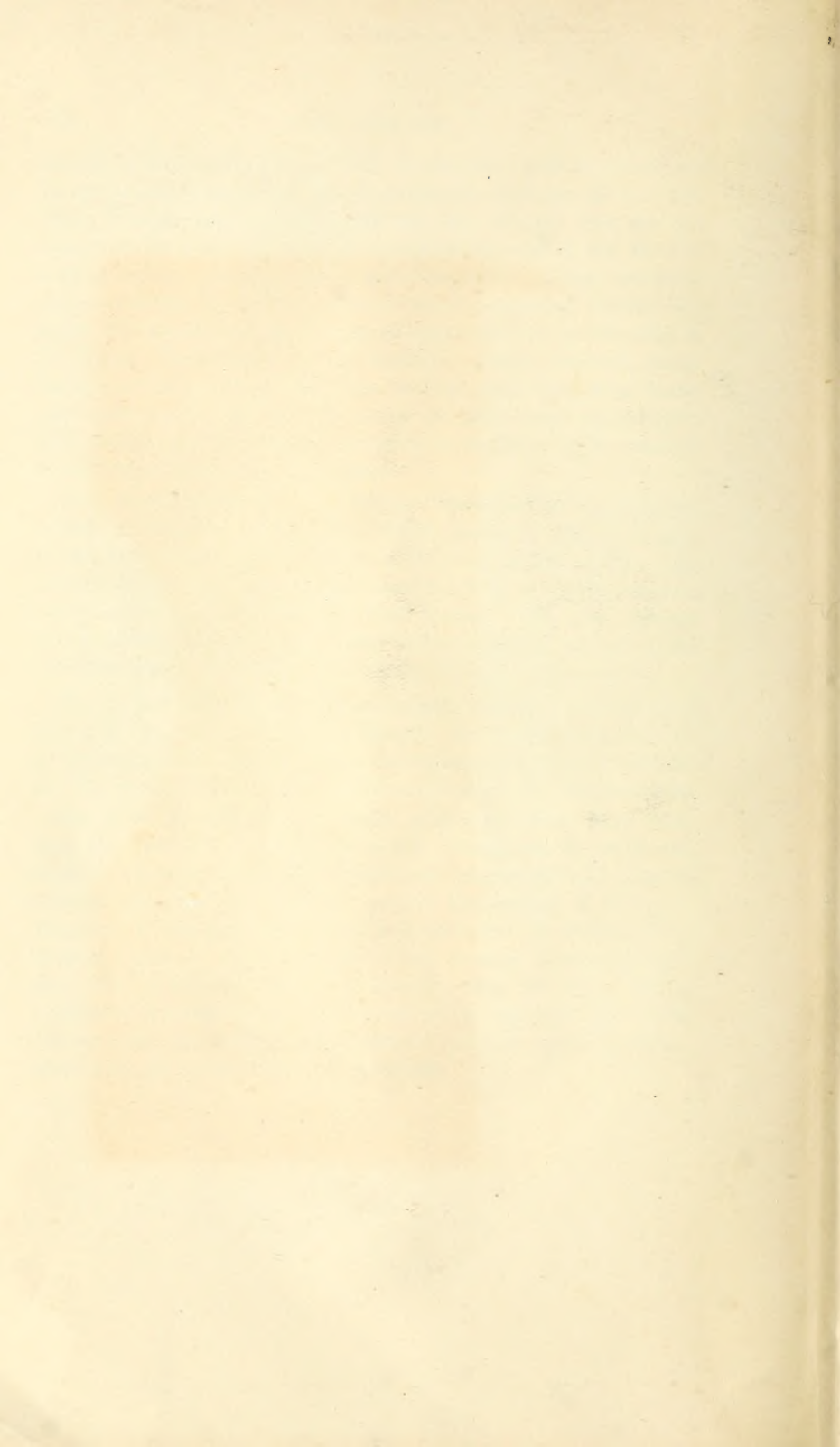
UNIO CORUSCUS, SUBLURIDUS, etc.—In looking over Mr. Berlin H. Wright's "Notes on *Unio coruscus* Gould," in the March NAUTILUS I see that he acknowledges that his *U. fryanus* can be con-

nected by intermediate forms with *U. coruscus*; and he states that he can as perfectly connect my *U. subuluridus* with any one of a half dozen Florida species. Not long ago Mr. Wright sent me for inspection the shells he identified as *subuluridus*, and I saw at once that he had made a total mistake as to the species; as these specimens were undoubted *U. buckleyi*, quite inflated, somewhat keeled, and rather smooth, shining shells, and no more like my species than is *U. obesus*. Individuals of *Unio buckleyi*, *coruscus*, *lugubris*, *hazelhurstianus*, and other species of the *buckleyi* group vary from being absolutely smooth and rayed, a young or adult stage generally to dull colored, and even rough externally, a condition quite common in old specimens.—Chas. T. Simpson.

COLLECTION OF SHELLS FOR SALE.—We learn that the collection of Rev. A. Dean, numbering about 3500 species, is offered for sale, as Mr. Dean is about to remove from his home at Muncy, Pa. The American land shells are richly represented by a nearly complete series, including almost all of the rarer species. The west African and Sandwich Island forms are also well represented, as well as an unusually large proportion of interesting foreign marine shells.

We are in receipt of "The Microscopical Bulletin" published by Queen & Co., which contains a Bargain list or Clearance sale of microscopes, objectives, etc. Any one desiring these should send for the February Bulletin to Queen & Co., Chestnut St., Philadelphia.

MR. B. B. WOODWARD has lately published (Ann. Mag. Nat. Hist. Feb., 1893) a classification of the *Pelecypoda*, in which the families of bivalves as given by Fischer are rearranged in accordance with Pelseneer's scheme founded on the morphology of the gills. The table of families is very useful as it gives the gist of Pelseneer's ideas at a glance. In his review of the various recent classifications Mr. Woodward does not mention that of DALL, being apparently ignorant of it. It is much to be regretted that those who set forth new classifications should not first acquaint themselves with the work of their predecessors.



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